TM 11-6130-241-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL, DS, GS, AND
DEPOT MAINTENANCE MANUAL

POWER SUPPLY PP-3939/G

INCLUDING REPAIR PARTS AND
SPECIAL TOOL LISTS

HEADQUARTERS, DEPARTMENT OF THE ARMY
28 February 1966

WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

105-125 VOLTS AC IS PRESENT ON POWER TRANSFORMER TERMINALS WHEN EXPOSED FOR MAINTENANCE TESTING.

DON'T TAKE CHANCES!

GPO 812—256—1

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TECHNICAL MANUAL
No. 11-6130-241-15

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D. C. 20315, 28 *February* 1965

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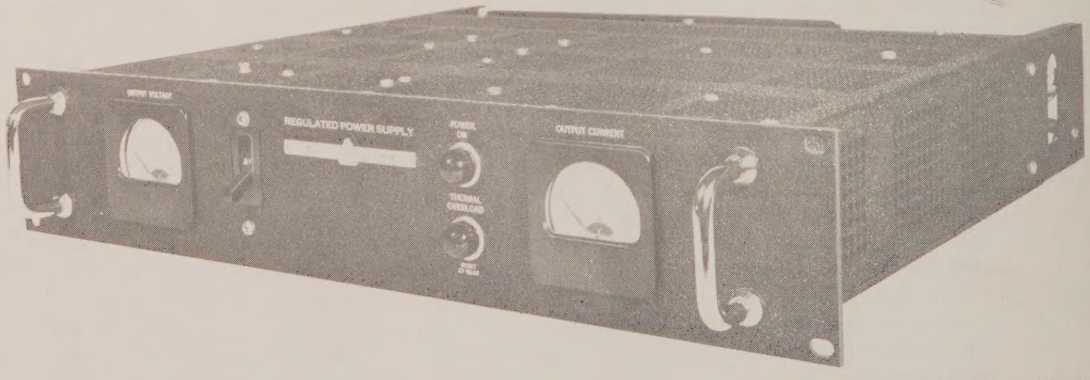

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Figure 1-1. *Power Supply PP-3939/G.*

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual describes Power Supply PP-3939/G and provides instruction for operation, operator and organizational maintenance, direct and general support, and depot maintenance.

1-2. Index of Equipment Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to this equipment. Department of the Army Pamphlet No. 310-4 is an index of current technical manuals, technical bulletins, supply manuals (types 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders that are available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc) and the latest changes to and revisions of each equipment publication.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publications 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting of errors, omissions, and recommendations for improving this equipment manual by the individual user is authorized and encouraged. DA Form 2028 will be used for reporting these improvements. This form may be completed using pencil, pen, or typewriter. DA Forms 2028 will be completed by the individual using the manual and forwarded direct to Commanding General, U. S. Army Electronics Command, ATTN: MSEL-MR-(NMP)-MA, Fort Monmouth, New Jersey 0773.

1-4. Electrical Characteristics

Dc output:

Voltage range	0-32, volts dc.
Current range	0-1 ampere.
Voltage bands	0-8, 8-16, 16-24, 24-32.
Regulation (line)	Better than 0.15 percent, or 20 millivolts (whichever is greater) for input variations from 105-125 volts ac.
Regulation (load)	Better than 0.15 percent, or 20 millivolts (whichever is greater) for load variations from 0 to full load.
Transient response (line)	Output voltage is constant within regulation specifications for step-function line voltage change of + 10 volts or —10 volts within the limits of 105-125 volts ac.
Transient response (load)	Output voltage is constant within regulation specifications for step-function load change from 0 to full load, or full load to 0 within 50 microseconds, after application.
Internal impedance	Less than 0.05 ohm.
Ripple and noise	Less than 1 millivolt rms, all models.
Polarity	Either positive or negative terminal may be grounded.
Ambient temperature and duty cycle	Continuous duty at full load up to 50°C. (122° F.) ambient.
Ac input	105-125 volts ac, 50-400 cps, 115 watts max.

1-5. Physical Data

Mounting	Standard 19″ rack mounting.
Size	3-1/2 in. h x 19 in. w x 14-3/8 in. d.
Weight	35 lb net; 65 lb shipping wt.
Panel finish	Black ripple enamel (standard).

CHAPTER 2

INSTALLATION AND OPERATING PROCEDURES

Section I. SERVICES UPON RECEIPT OF EQUIPMENT

2-1. Unpacking

a. Cut the waterproof tape that seals the top of the shipping carton.

b. Remove the enclosed cardboard carton.

c. Cut the waterproof tape that seals the top of the cardboard carton.

d. Open the moisture-vaporproof barrier in the cardboard container.

e. Remove the enclosed cardboard carton.

f. Cut the waterproof tape that seals the top of the cardboard carton.

g. Remove the humidity indicator, the desiccant, and the pads.

h. Remove the power supply unit.

2-2. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, refer to paragraph 1-3.

b. Check the equipment against the packing list. When no packing list accompanies the equipment, use the table of components as a general check.

2-3. Installation

a. All tubes, the fuse, and the power indicator lamp are installed in the power supply when the equipment is shipped.

b. The power unit is to be installed in a standard 19-inch relay rack for use.

2-4. Preparation for Use

a. The ON-OFF circuit breaker should be in the OFF position.

b. Plug the power cord into a source of 115 volts alternating current (ac), 50-400 cycles per second (cps).

c. Make the necessary load connections to the rear terminal board as specified by the local requirements.

Section II. OPERATING INSTRUCTIONS

2-5. Controls, Instruments, and Fuses (fig. 2-1 and 2-2)

a. ON-OFF Circuit Breaker. The ON-OFF circuit breaker, located on the front panel, controls the application of input power to the supply. Overload of the supply causes the breaker to trip. When the breaker is in the ON position, the POWER ON indicator lamp glows.

b. Output Voltage Controls.

(1) Range switches S1 and S2 select the direct-current (dc) operating voltage band. The switch positions are identified by A, B, and C, D. The following chart lists the operating voltage band and the corresponding range switch positions.

RANGE VDC	Switch positions
0-8	B + D
8-16	A + D
16-24	B + C
24-32	A + C

(2) The DC VERNIER CONTROL varies the dc voltage in each of the voltage bands. Clockwise rotation results in increasing voltage.

c. Thermostat and THERMAL OVERLOAD Indicator. The manual reset-type thermostat is located on the transistor deck in the rear. The thermostat opens when the temperature of the supply exceeds a maximum safe value. Input power is removed when the thermostat opens. The power supply must cool down for operation to be restored. Opening of the thermostat causes the THERMAL OVERLOAD indicator on the front panel to glow and the POWER ON light to extinguish. When proper temperature is reached, depress the manual THERMAL OVERLOAD reset button on rear deck to restore operation.

d. Connection Terminals. Make all connections to the supply at the terminal block on the rear deck. Apply input power through the line cord or direct to terminals 1 and 2 if the

line cord has been removed. The supply positive terminal is brought out to terminals 3, 4, and 5. The supply negative terminal is brought out to terminals 7, 8, and 9. The recommended wiring of the power supply to the load, and the selection of wiring is shown in figures 2-5 through 2-8. These diagrams follow the power supply schematic diagram in this manual. Selection of the proper wiring is made on the basis of load requirements.

e. OUTPUT VOLTAGE Meter. A 0- to 32-volt dc voltmeter monitors the voltage at the output terminals.

f. OUTPUT CURRENT Meter. A 0- to 1-ampere dc ammeter monitors the output load current.

g. Fuses. The following chart lists the fuses, their ratings, functions and locations. Overload of the supply may cause the circuit breaker to trip without blowing the fuses.

Circuit symbol	Rating (SLO-BLO)	Function	Location
F1	3A	Ac input	Rear deck (fig. 2-2).
F2	1A	Dc internal (auxiliary circuits).	Transformer deck (fig. 4-1).
F3	4A	Dc internal (power circuits).	Transformer deck (fig. 4-1).

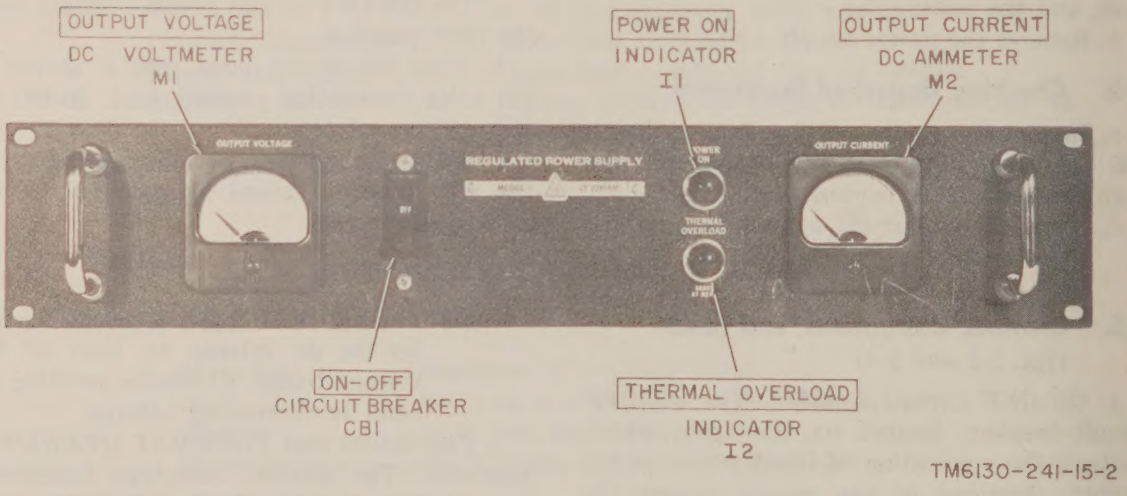


Figure 2-1. Power supply, front view.

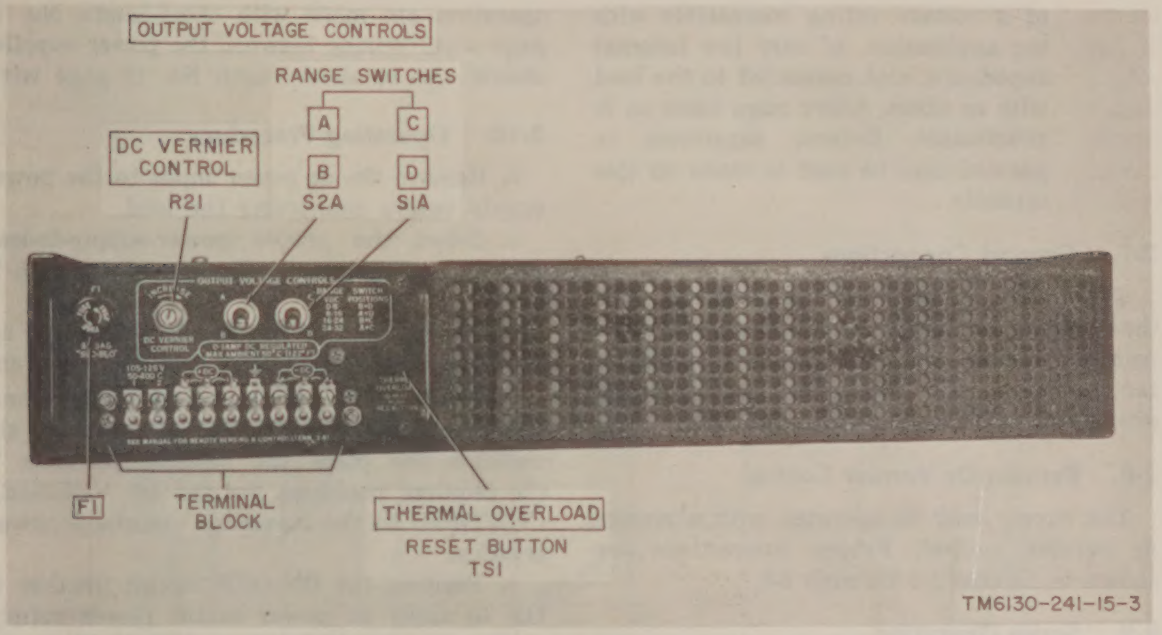


Figure 2-2. Power supply, rear view.

2-6. Power-Supply-to-Load Wiring

a. The output impedance, regulation, and transient response of each power supply are so low that connecting leads of practical length can measurably affect these parameters at the load. Provisions have been made to overcome or to minimize the effects of these connecting leads.

b. The effect of the connecting leads and the recommended methods of hookup to the power supply are shown in figures 2-3 through 2-8.

(1) Figure 2-3 shows the connecting cable voltage drop versus cable length for the simple two-wire connection.

(2) Figure 2-4 shows the connecting cable voltage drop versus cable length for the improved two-wire connection.

(3) Figure 2-5 illustrates the two-wire connection with wire size 18 AWG. This is the simplest hookup and should be suitable for most applications where extremely close load regulation and fast transient response over the full rated current excursion are not required.

(4) Figure 2-6 illustrates the improved two-wire connection with wire size 18 AWG. The number of terminals provided permit, in a practical way, the use of paralleled heavy gage leads. If the leads are not unduly long, this hookup will yield excellent regulation and transient response.

(5) Figure 2-7 illustrates the minimum wire gage sizes used in the four-wire connection. This hookup provides complete compensation for connecting cable dc drops. For cable lengths up to approximately 25 feet, it will permit good transient response at the load, provided the load current changes do not exceed the rate of 1 ampere per millisecond.

(6) Figure 2-8 illustrates the minimum gage sizes used in the six-wire connection. This hookup provides complete compensation for connecting cable dc drops. For cable lengths up to approximately 25 feet, the transient response will also be optimized so that it is essentially the same as that at the output terminals. The

capacitor shown bypassing the load should be at least 5,000 microfarads, of a voltage rating compatible with the application, of very low internal impedance, and connected to the load with as short, heavy gage leads as is practicable. Several capacitors in parallel may be used to make up this capacity.

2-7. Ground Connections

The power supply may be operated with the positive or negative terminal grounded, or neither terminal grounded. Proper connections for operation with either terminal grounded are shown in figures 2-5 through 2-8.

2-8. Remote Dc Vernier Control

The supply may be operated with a remote dc vernier control. Proper connections are shown in figures 2-5 through 2-8.

2-9. Series Operation

Several units of one model may be wired in series to provide dc voltages in excess of 32 volts. The connections recommended for this operation are made with short-length No. 12 gage wire. Wiring between the power supplies should also be short-length No. 12 gage wire.

2-10. Operating Procedure

a. Remove the ac power input to the power supply before connecting the load.

b. Select the proper power-supply-to-load wiring by referring to figures 2-3 through 2-8.

c. Connect the power supply to load in accordance with the applicable wiring diagram.

d. Select the desired operating voltage band. Refer to the switch table adjacent to the switches and place the selector switches to the required positions. Set the DC VERNIER CONTROL to the maximum counterclockwise position.

e. Position the ON-OFF circuit breaker to ON to apply ac power to the power supply. Adjust the DC VERNIER CONTROL to the desired operating voltage.

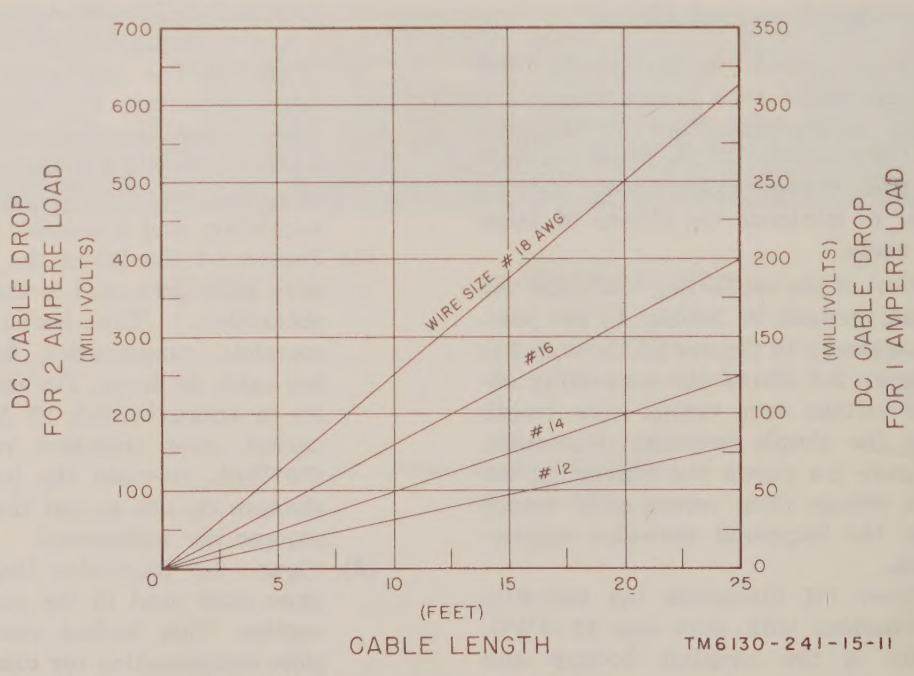


Figure 2-3. Cable length for two-wire connection.

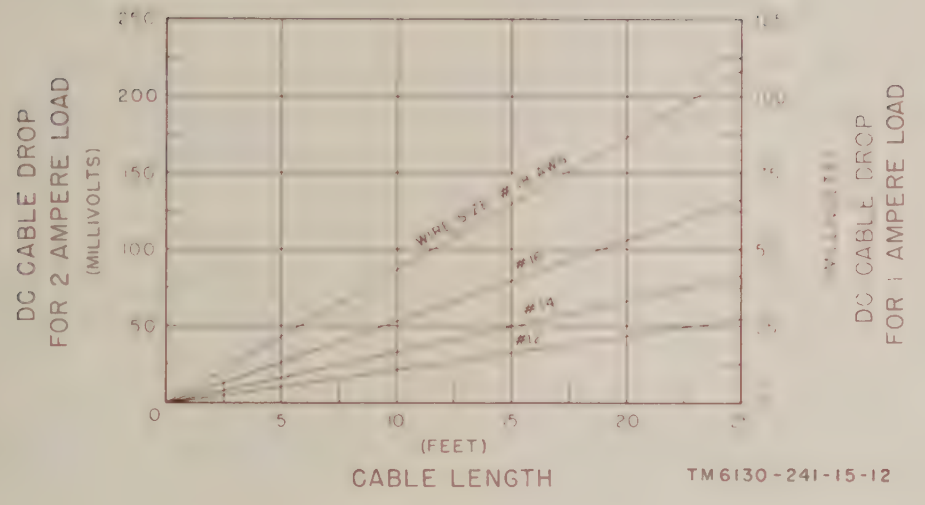
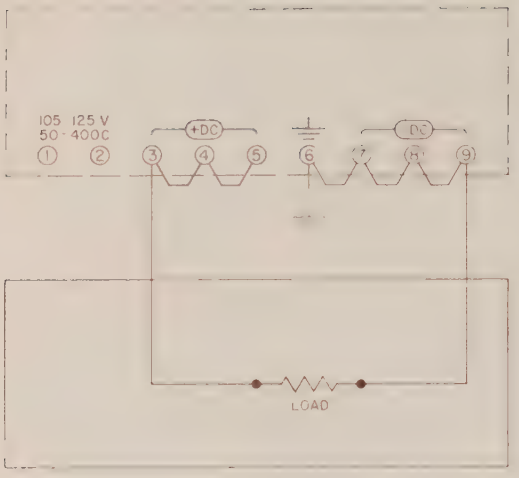
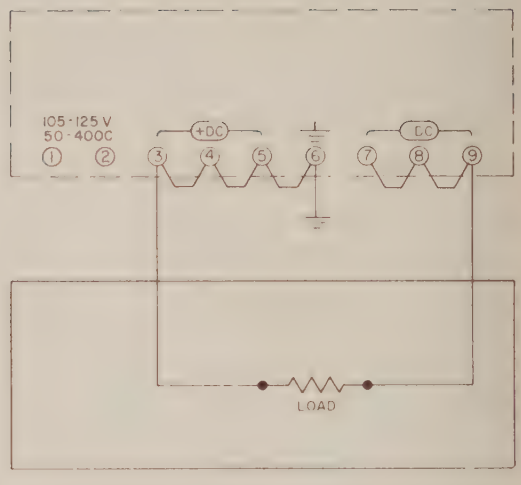


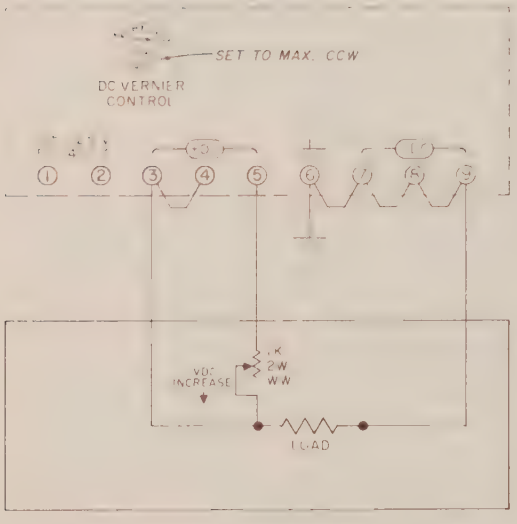
Figure 2-4. Cable length for improved two-wire connection.



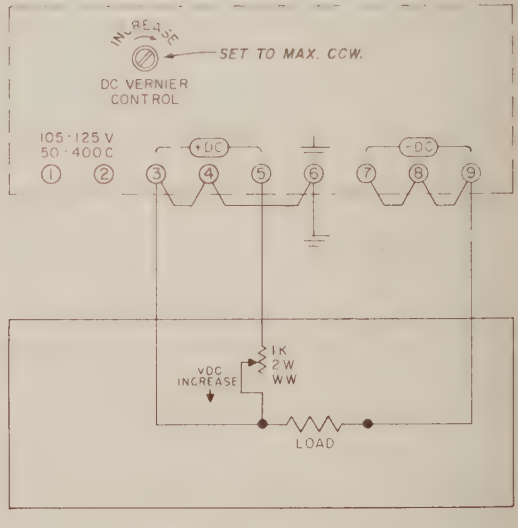
A. NEGATIVE TERMINAL GROUNDED



B. POSITIVE TERMINAL GROUNDED



C. REMOTE DC VERNIER CONTROL
WITH NEGATIVE TERMINAL GROUNDED



D. REMOTE DC VERNIER CONTROL
WITH POSITIVE TERMINAL GROUNDED

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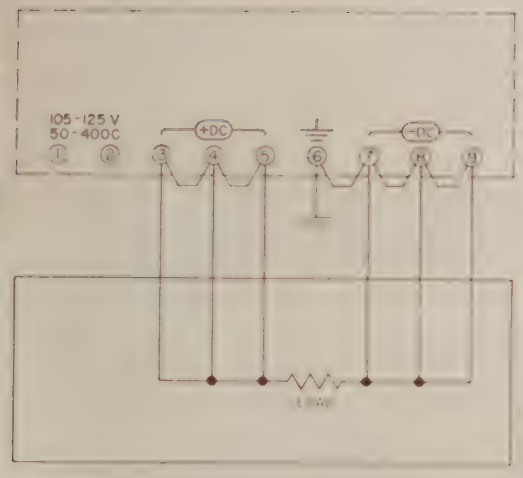
Figure 2-5. Two-wire connection, wire size 18 AWG for 1-ampere load.



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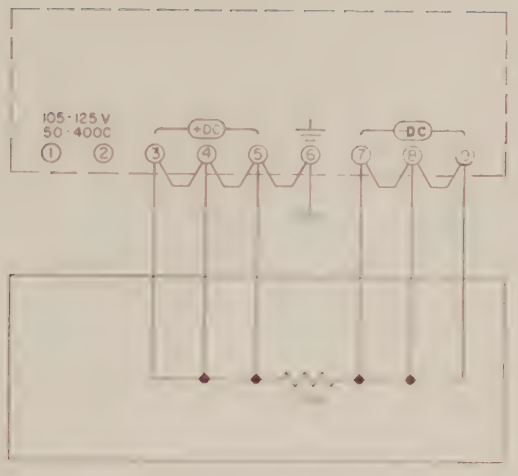
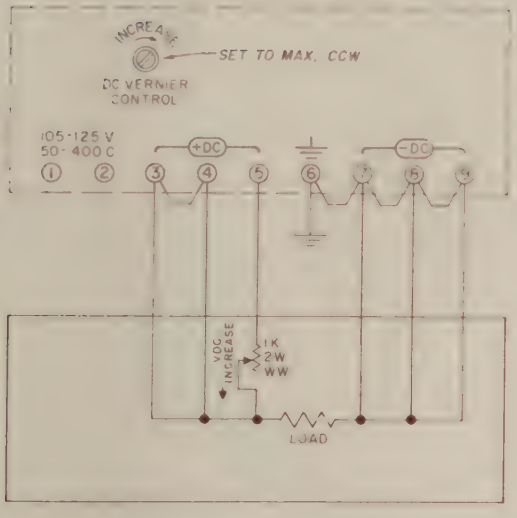
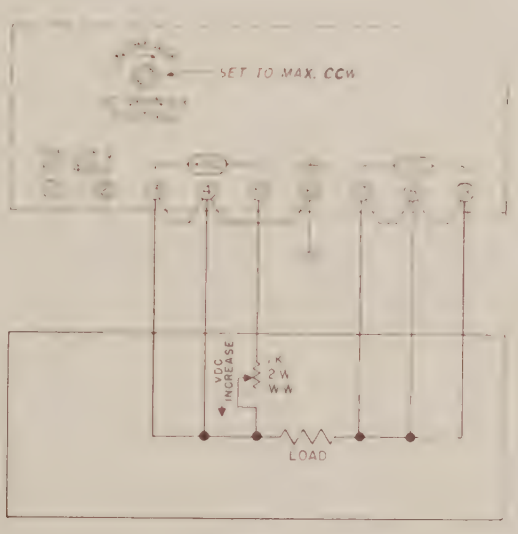


B. POSITIVE TERMINAL GR



C. REMOTE DC VERNIER CONTROL
WITH NEGATIVE TERMINAL GROUNDED



D. REMOTE DC VERNIER CONTROL
WITH POSITIVE TERMINAL GROUNDED

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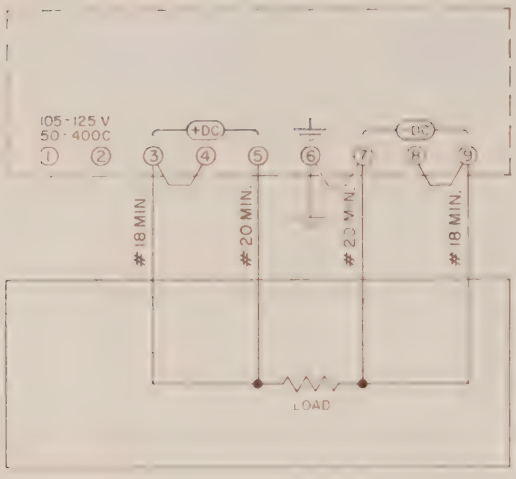
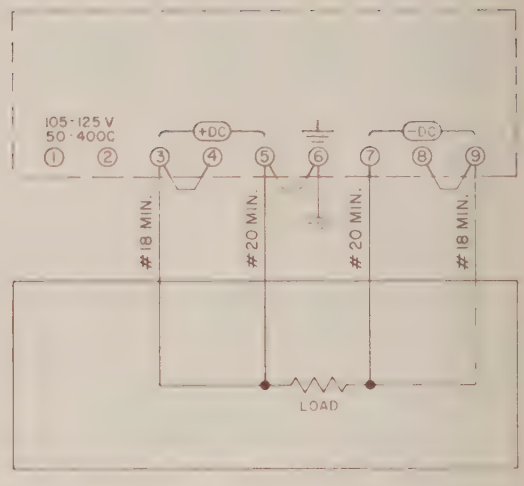
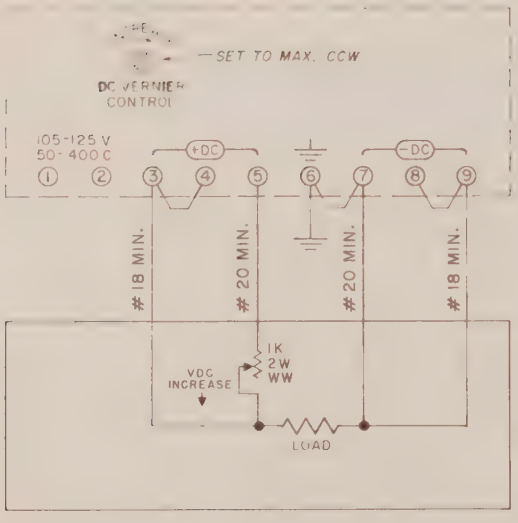
Figure 2-6. Improved two-wire connection, wire size 18 AWG for 1-ampere load.



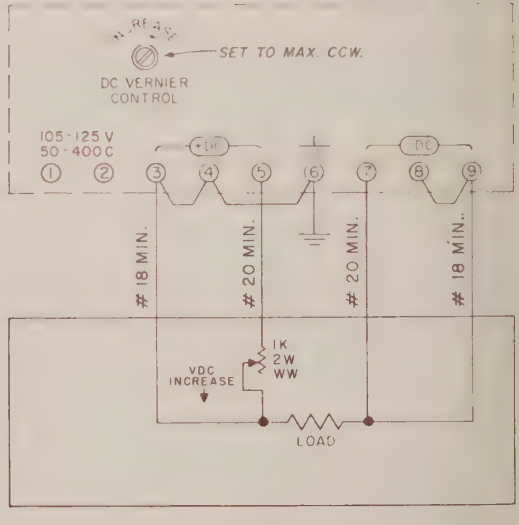
A. NEGATIVE TERMINAL GROUNDED



B. POSITIVE TERMINAL GROUNDED



C. REMOTE DC VERNIER CONTROL
WITH NEGATIVE TERMINAL GROUNDED



D. REMOTE DC VERNIER CONTROL
WITH POSITIVE TERMINAL GROUNDED

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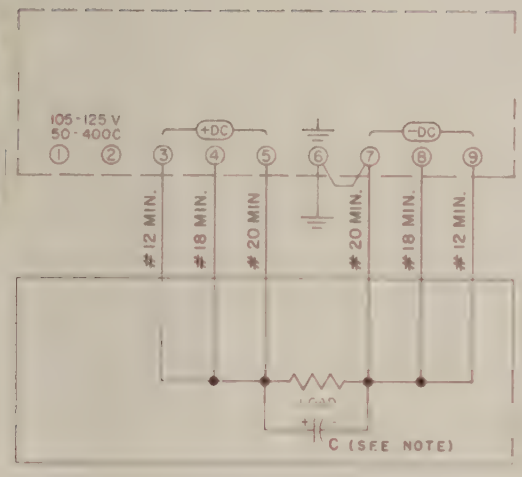
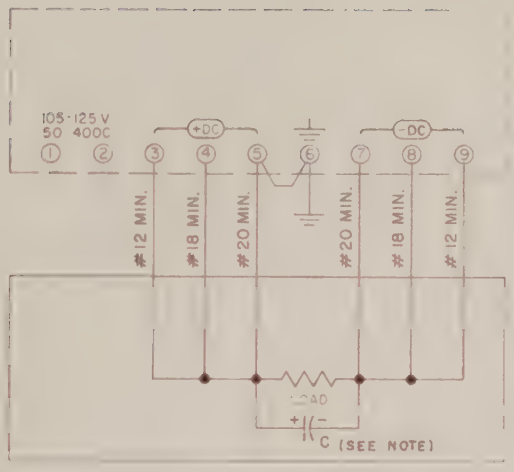
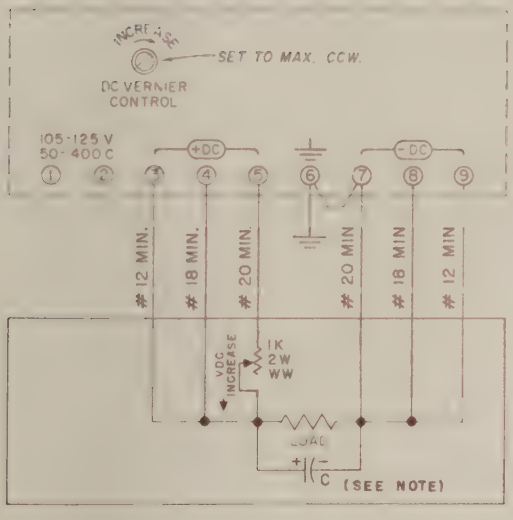
Figure 2-7. Four-wire connection, minimum wire sizes for 1-ampere load.



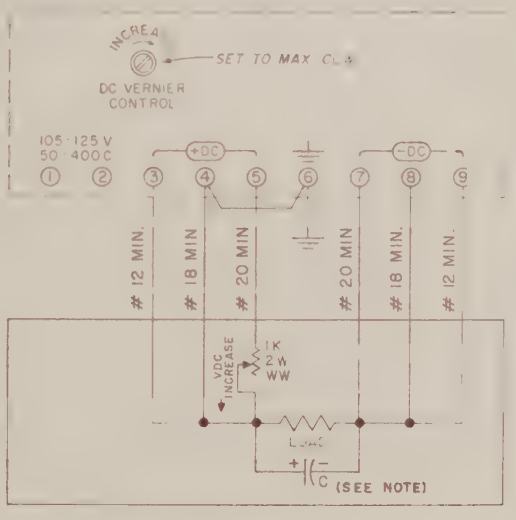
A. NEGATIVE TERMINAL GROUNDED



B. POSITIVE TERMINAL GROUNDED



C. REMOTE DC VERNIER CONTROL WITH NEGATIVE TERMINAL GROUNDED



D. REMOTE DC VERNIER CONTROL WITH POSITIVE TERMINAL GROUNDED

NOTE:

BYPASS CAPACITOR MUST BE AT LEAST 5,000 MICROFARADS AND HAVE A WORKING VOLTAGE RATING AT LEAST DOUBLE THE POWER SUPPLY OUTPUT VOLTAGE.

TM6130-241-15-16

Figure 2-8. Six-wire connection, minimum wire sizes for 1-ampere load.

CHAPTER 3

PREVENTIVE MAINTENANCE INSTRUCTIONS

3-1. Scope of Maintenance

The maintenance duties assigned to the operator and organizational maintenance personnel of the power supply are listed below, together with references to the paragraphs covering the specific maintenance functions. The duties assigned do not require tools or test equipment other than those issued with the equipment.

a. Operator's daily preventive maintenance checks and services (para 3-4).

b. Organizational weekly preventive maintenance checks and services (para 3-5).

c. Organizational monthly preventive maintenance checks and services (para 3-6).

d. Organizational quarterly preventive maintenance checks and services (para 3-7).

e. Cleaning (para 3-8).

f. Touchup painting instructions (para 3-9).

3-2. Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 3-4 through 3-9 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (para 3-4 through 3-7) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat-serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators and maintenance personnel in maintaining combat serviceability, the charts indicate what to check, how to check, and what the normal conditions are; the *References* column lists the illustrations, paragraphs, or manuals that contain detailed repair or replacement procedures. If the defect cannot be remedied by the corrective actions listed, higher level maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

3-3. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of the power supply are required daily, weekly, monthly, and quarterly.

a. Paragraph 3-4 specifies the checks and services that must be accomplished daily (or at least once each week if the equipment is maintained in standby condition).

b. Paragraphs 3-5, 3-6, and 3-7 specify *additional* checks and services that must be performed on a weekly, monthly, and quarterly basis, respectively.

3-4. Operator's Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Completeness	See that the equipment is complete.	Appx II.
2	Exterior surfaces	Clean the exterior surfaces, including the panel and meter glasses. Check all meter glasses and indicator lenses for cracks.	Para 3-8.
3	Connections	Check the tightness of all connections.	None.
4	Controls and indicators.	While making the operating checks (item 5), observe that the mechanical action of each knob, dial, and switch is smooth, and free of external or internal binding, and that there is no excessive looseness. Also check the meters for sticking or bent pointers.	None.
5	Operation	Operate the equipment according to paragraph 2-5.	Para 2-5.

3-5. Organizational Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Cables	Inspect cords, cables, and wires for chafed, cracked, or frayed insulation. Replace connectors that are broken, arced, stripped, or worn excessively.	None.
2	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Clean and touch up paint as required.	Para 3-9.

3-6. Organizational Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Pluckout items	Inspect seating of pluckout items.	None.
2	Transformer	Inspect the power transformer. All nuts must be tight. There should be no evidence of dirt or corrosion.	None.
3	Terminal strip	Inspect the terminal strip for loose connections and cracked or broken insulation.	None.
4	Resistors and capacitors.	Inspect resistors and capacitors for cracks, blistering, or other detrimental defects.	None.

3-7. Organizational Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Publications	See that all publications are complete, serviceable, and current.	DA Pam 310-4
2	Modifications	Check DA Pam 310-4 to determine whether new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	TM 38-750 and DA Pam 310-4
3	Spare parts	Check all spare parts (operator and organizational) for general condition and method of storage. No overstock should be evident and all shortages must be on valid requisitions.	Appx II.

3-8. Cleaning

Inspect the exterior of the power supply. The exterior surfaces should be free of dust, dirt, grease, and fungus.

a. Remove dust and loose dirt with a clean, soft cloth.

Warning; **Prolonged breathing of cleaning compound is dangerous; make certain that**

adequate ventilation is provided. Cleaning compound is flammable; do not use near a flame. Avoid contact with the skin; wash off any that spills on your hands.

b. Remove grease, fungus, and ground-in dirt from the cases; use a cloth dampened (not wet) with Cleaning Compound (FSN 7930-395-9542).

c. Remove dust or dirt from the terminal strip with a brush.

Caution: **Do not press on the meter face (glass) when cleaning: the meter may become damaged.**

d. Clean the front panel and meters with a soft, clean cloth. If dirt is difficult to remove, dampen the cloth with water; mild soap may be used for more effective cleaning.

3-9. Touchup Painting Instructions

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TB SIG 364.

3-10. General Support and Depot Maintenance, Functions of Equipment

The power supply circuitry consists of two basic systems, the bias system and the main power system. The bias system consists of bias power rectifier CR3, voltage regulator Q4, emitter follower Q6, current amplifier Q7, voltage divider R28-R29, reference diode CR5, and bias differential amplifier Q8-Q9. The main power system consists of back-bias rectifer CR2, surge protector CR7, main power rectifier CR1, series regulator Q1-Q2, emitter-follower drivers Q3 and Q5, current amplifier Q12, main differential amplifier Q10-Q11, and output voltage sensing divider R19-R24. An input circuit and transformer T1 serve both systems. The circuit block diagram is shown in figure 3-1. The unit schematic diagram is figure 6-3.

3-11. Detailed Functional Description

a. Single-phase input power is applied to transformer T1, through the input circuit containing magnetic circuit breaker CB1 and thermostat TS, which protect the supply against overload and overheating, respectively.

b. The main rectifier, CR1, is a full-wave bridge rectifier that provides the power which is regulated and delivered to the output. Half-wave back-bias rectifier CR2 provides a positive voltage for use as a base-bias for the series regulators. A stable negative voltage from bias power rectifier CR3 operates the bias system consisting of voltage regulator Q4, emitter follower Q6, current amplifier Q7, differential amplifier Q8-Q9, and reference diode CR5. Reference diode CR5 establishes a stable 12 volts for operation of current amplifier Q12, differential amplifiers Q10 and Q11 of the main power system, and Q8 and Q9 of the bias regulator system.

c. Current from R17 operates CR5 which, in turn, sets the voltage on the bases of Q9 and Q10, the input transistors for the bias and main differential amplifiers. Transistors Q8 and Q9 are connected as a balanced differential amplifier which compares the potential from CR5 with the potential derived from the voltage across the bias output by voltage divider R28 and R29. The amplified error signal in the collectors of Q8 and Q9 is amplified by current amplifier Q7 and by emitter follower Q6 which varies the drive to Q4. Voltage regulator Q4 regulates only the internal power and stabilizes the bias system potential. Dissipation in Q6 is minimized by operating the transistor within the forward drop of diodes CR4 and CR8 which carry the current from R33. The cathode of CR8 is the most negative stable voltage in the circuit, which makes it a desirable return point for R30, the collector load for Q7. Capacitors C5 and C6 stabilize the feedback loop of this internal bias regulator.

d. Voltage regulator Q4 thus stabilizes the operation of refrence diode CR5 by providing a stable voltage source for its operation. The voltage across CR5 also is applied to main differential amplifier Q10 and Q11 as one input and the voltage across R24 and part of R23 as the other input derived from the output voltage divider. To balance the differential amplifier, the circuit will adjust the output voltage sensed by the divider so that the voltage across R23 and R24 is equal to the

voltage provided by CR5. Resistor R12 and capacitor C8 help stabilize the feedback loop.

e. The error signal derived from the collectors of the main differential amplifier is fed to current amplifier Q12, proceeds through and is amplified by emitter-follower drivers Q5 and Q3, and is applied to the paralleled bases of series power transistors Q1 and Q2. Resistor R6 provides base turnoff bias to these transistors from the bias voltage across C4. Resistors R4 and R5 help divide the output current equally through the series transistors.

f. Transistors Q1 and Q2 function as the series-regulating element in the negative line from the main rectifier. The voltage drop across these power transistors and the heat dissipation in them are kept low by switching the ac output from two tapped secondary windings of transformer T1. Switches S1A and S2A are mechanically linked with switches S1B and S2B in the voltage-sensing divider of the output circuit. In each of the combinations of positions for these switches, the transformer ac output is connected for the minimum voltage necessary to permit the regulator to function at full-load current and low-line voltage.

g. Resistors R35 and R36 are the turn-on and turn-off surge-current limiters for rectifiers CR2 and CR3. Resistor R2 functions during short-circuit load conditions to provide sufficient drop to keep the series regulator transistors in saturation; this effectively limits dissipation.

h. Diode CR6, together with resistor R40, prevents burnout of transistor Q11 by clamping the base voltage within acceptable limits whenever the series-regulator transistors short out. Diode CR7 and resistor R7 provide back bias and load for the series-regulator transistors during turn-on and turn-off to prevent overshoot at low load conduction.

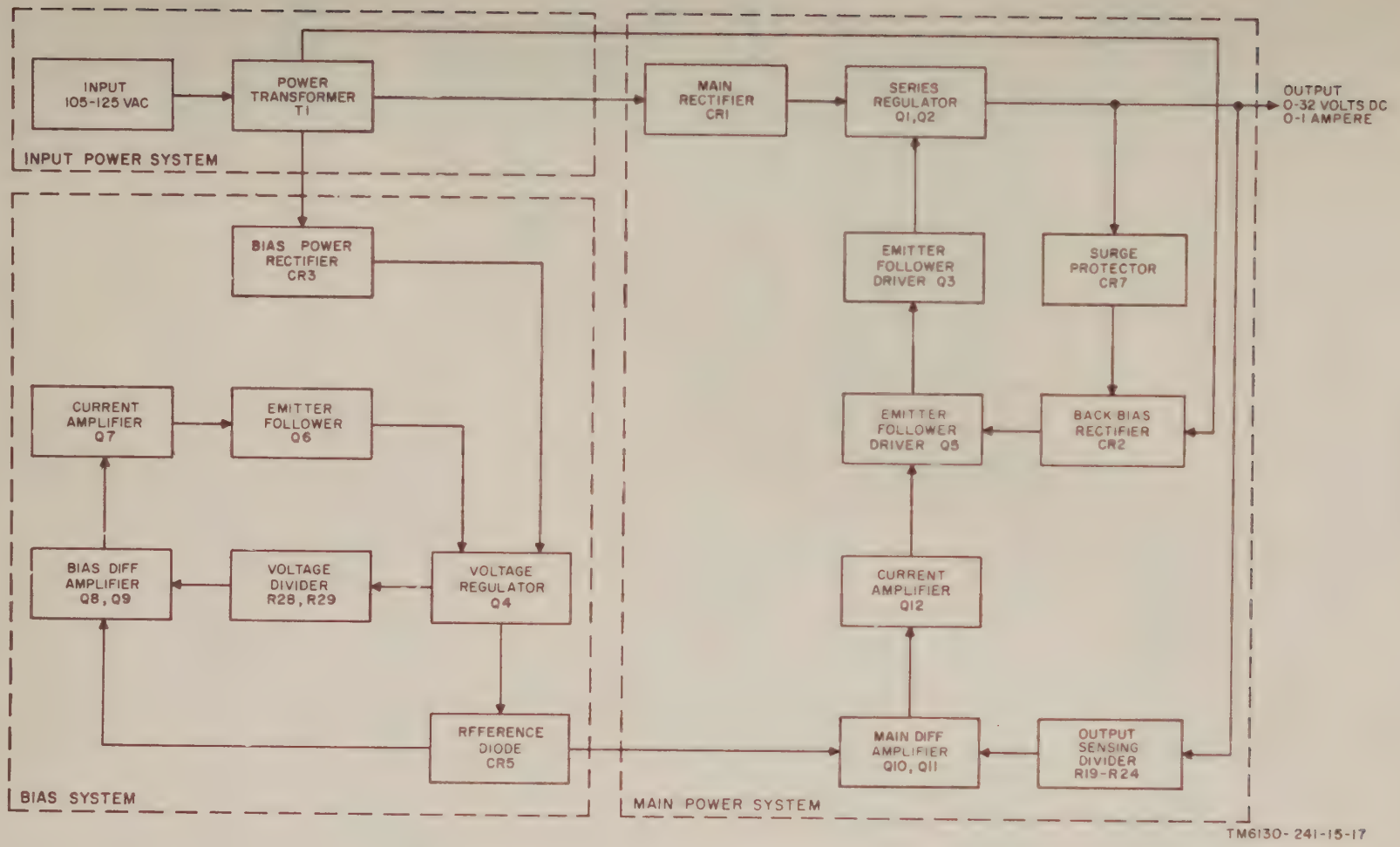


Figure 3-1. Power supply block diagram.

CHAPTER 4

TROUBLE SHOOTING

4-1. Troubleshooting Procedure

a. Perform the normal starting procedure to place the power supply into operation.

b. Observe all abnormal functioning of the equipment.

c. Use the trouble chart below as a guide to localizing the fault.

d. Isolate the fault to a single component by use of the voltage chart in paragraph 4-2.

e. The following chart lists the symptoms of abnormal operation, the probable causes of the trouble, and the corrective measures to be taken.

Symptom	Probable cause	Corrective measure
1. POWER ON lamp I1 does not light with ON-OFF circuit breaker CB1 in ON position; no output voltage; THERMAL OVERLOAD lamp is not lighted.	No power input.	Check power source, line cord, and line cord plug; replace fuse; replace CB1.
	Defective fuse F1 or F2; defective circuit breaker CB1.	
2. Same as 1 above, except THERMAL OVERLOAD lamp I2 is lighted.	Thermostat TS1 overheated or defective.	Reset TS1 at rear of chassis; replace if necessary.
3. Same as 1 above, except POWER ON lamp I1 is lighted.	Transformer T1 primary circuit open.	Continuity check primary for open circuit; replace T1 if necessary.
4. Same as 1 above, except output voltage is normal.	Defective POWER ON lamp I1.	Replace lamp I1.
5. No output voltage; fuse F3 is blown.	Short in rectifier CR1; capacitor C1 shorted.	Replace capacitor C1 or rectifier CR1.
6. Same as 5 above, except fuse F2 is blown.	Capacitor C4 or C2 shorted.	Replace capacitor C2 or C4.
7. No output voltage; circuit breaker CB1 does not open.	Diode CR5 or capacitor C3 shorted.	Replace faulty component.
8. No output voltage; circuit breaker CB1 opens.	Capacitor C11 or C9 shorted.	Replace capacitor C11 or C9.
9. At high temperature, high output voltage; poor regulation. (At low temperatures, operation is normal.)	Diode CR2 open or capacitor C10 shorted.	Replace diode CR2 or capacitor C10.
10. High output voltage; poor regulation; high ripple.	Open jumpers at output terminals, or incorrect wiring in sensing connections; regulator transistors Q1, Q2 shorted; driver transistor Q3 shorted; differential amplifier transistors Q10, Q11 shorted.	Repair jumper connections and/or check for proper supply-load sensing connections; check transistor resistance and replace defective component.
11. Normal output voltage; ripple and regulation poor.	Failure of transistors Q4, Q6-Q9.	Replace defective component.

4-2. Troubleshooting Voltages

a. The following chart gives the normal dc voltages that should be measured with reference to —DC (terminals 7, 8, and 9), by use of a multimeter.

Transistor	Elements		
	Emitter (volts)	Base (volts)	Collector (volts)
Q1	−0.2	−0.3	−30
Q2	−0.2	−0.3	−30
Q3	−0.3	−0.5	−30
Q4	−12.1	−12.2	−25.5
Q5	−0.5	−0.65	−9.3
Q6	−12.2	−12.3	−20
Q7	−8.5	−8.6	−12.3
Q8	−5.9	−6	−8.5
Q9	−5.9	−6	−8.6
Q10	−5.9	−6	−7.7
Q11	−5.9	−6	−7.5
Q12	−7.7	−7.5	−0.65

b. The following chart gives the normal ac voltages that should be measured between various secondary terminals of power transformer T1. The measurements are made by use of the multimeter, with 115-volt ac input, and with no load applied.

Switch positions	T1 secondary terminals (volts ac)		
	A3 to B4	B1 to B6	A1 to B1
B + D	21.5	15	39
A + D	30	15	39
B + C	38	15	39
A + C	46.5	15	39

4-3. Adjustments

a. The prescribed adjustments of calibration control R23 (fig. 4-1) is the only maintenance (nonoperational) adjustment required.

b. Adjust calibration control R23 as follows:

(1) Operate the power supply with local sensing and no external load.

(2) Position switches S1 and S2 at C and A, respectively, and set DC VERNIER CONTROL R21 at the minimum position.

(3) Adjust R23 for a 23-volt dc output, using a dc voltmeter of 1 percent accuracy or better. Turn the shaft firmly to break the glyptal thread seal.

(4) Place switches S1 and S2 in D and B, respectively, and R21 at its minimum position. Check for 0-volt output.

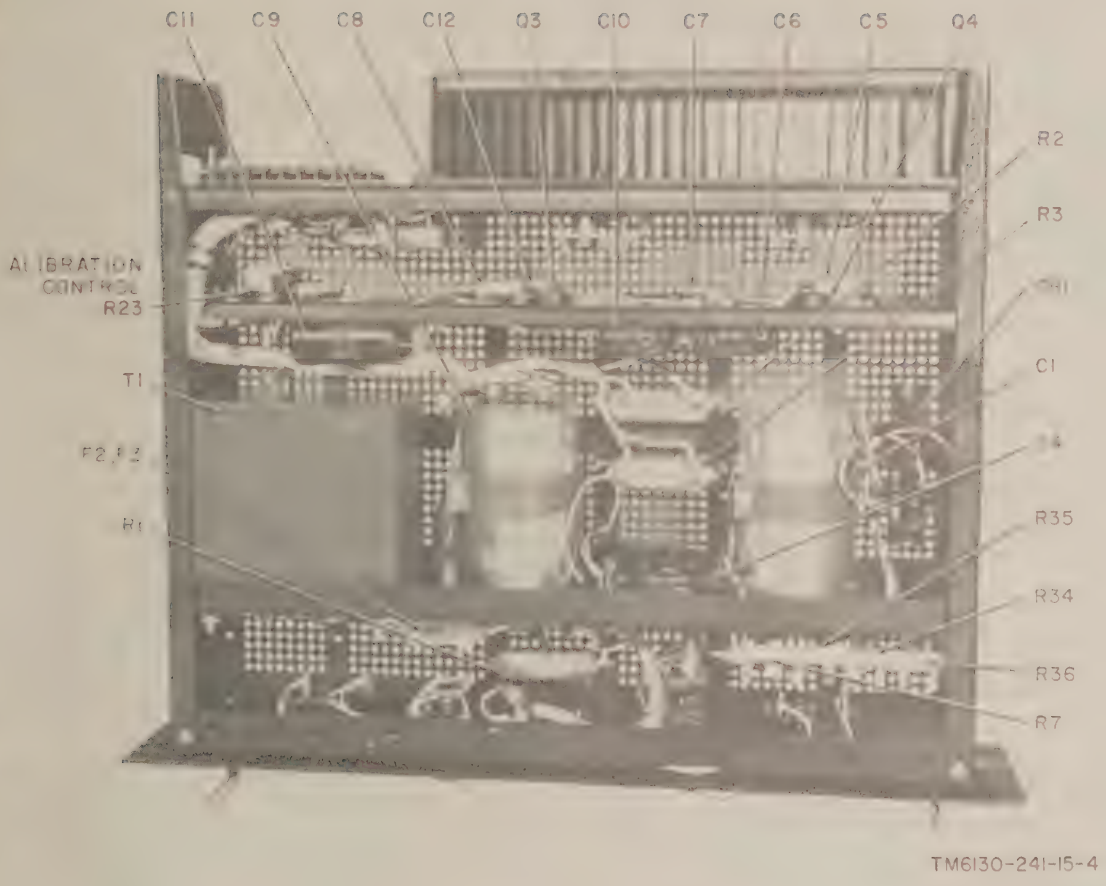


Figure 4-1. Component locations, internal bottom view.

CHAPTER 5

DEPOT INSPECTION STANDARDS

5-1. Applicability of Depot Inspection Standards

The tests outlined in this chapter are designed to measure the performance capability of a repaired equipment. Equipment that is to be returned to stock should meet the standards given in these tests.

5-2. Applicable References

a. Repair Standards. The applicable procedures of the Army depots performing these tests and the general standards for repaired electronic equipment given in TB SIG 355-1, TB SIG 355-2, and TB SIG 355-3 form a part of the requirements for testing this equipment.

b. Modification Work Orders. Perform all modification work orders applicable to this equipment before making the tests specified. DA Pam 310-4 lists all available MWO's.

5-3. Test Facilities Required

The following items are required for depot testing:

Item	Technical manual	Common name
Voltmeter, Electronic AN/USM-98	TM 11-6625-438-10	Dc voltmeter.
Voltmeter, Electronic ME-30(*)/U[a]	TM 11-6625-320-12	Ac voltmeter.
Multimeter TS-352 U	TM 11-5527	Multimeter.
Multimeter ME-26B/U	TM 11-6625-200-12	Vtvm.
Variable Power Transformer TF-171/USM.		Variable power transformer.
Variable resistor, 50-ohm, 150-watt, FSN 5905-155-7012.		Adjustable resistor.

[a] Voltmeter, Electronic ME-30(*) U indicates Voltmeter, Meter ME-30A U, or Voltmeter, Electronic ME-30B U, ME-30C/U, or ME-30E/U.

5-4. General Test Requirements

The power supply shall be tested in accordance with the sequence of test procedures given in the following paragraphs. Tests are to be performed with the equipment removed from its rack. Test hookups are indicated by individual illustrations as required for each test. Refer to figures 2-1, 2-2, and 4-1 for the locations of equipment controls and indicators.

Warning: **Dangerous voltages exist in this equipment. Observe all safety precautions when operating the equipment and making connections to terminals. Serious injury or death may result from contact with these terminals.**

5-5. Power Circuit Test

This test determines whether any short circuits exist in the ac input circuit or dc output circuit of the supply before ac power is applied to the unit. With no ac power applied to the power supply terminals (input power cable unplugged), use the vtvm and check for short circuits between terminals + DC and GRD; —DC and GRD; + DC and —DC; AC PWR and GRD; AC COM and GRD.

Note: Allow a warmup period of 1 minute for the power supply before performing the following tests.

5-6. Range Switch Calibration Test

This test checks the calibration of output voltage of the supply for the various range switch positions. Connect the equipment as shown in figure 5-1.

a. Rotate the DC VERNIER CONTROL (fig. 2-2) to zero (maximum counterclockwise).

b. Place the range switches (fig. 2-2) at A and C.

c. Apply 105 volts ac to the power supply. Place the ON-OFF circuit breaker (fig. 2-1) to ON.

d. Adjust the calibration control R23 (fig. 4-1) for a 23.5-volt dc output + 0.2.

e. Place the range switches at B and D. The meter must read zero or slightly negative.

f. Place the range switches at B and C. The

output voltage must read between 14 and 15 volts.

g. Place the range switches at A and D. The output voltage must read between 6 and 7 volts.

h. Return the range switches to A and C.

i. Rotate the DC VERNIER CONTROL (fig. 2-2) to the maximum clockwise position. The range of the vernier control must be 10 volts minimum.

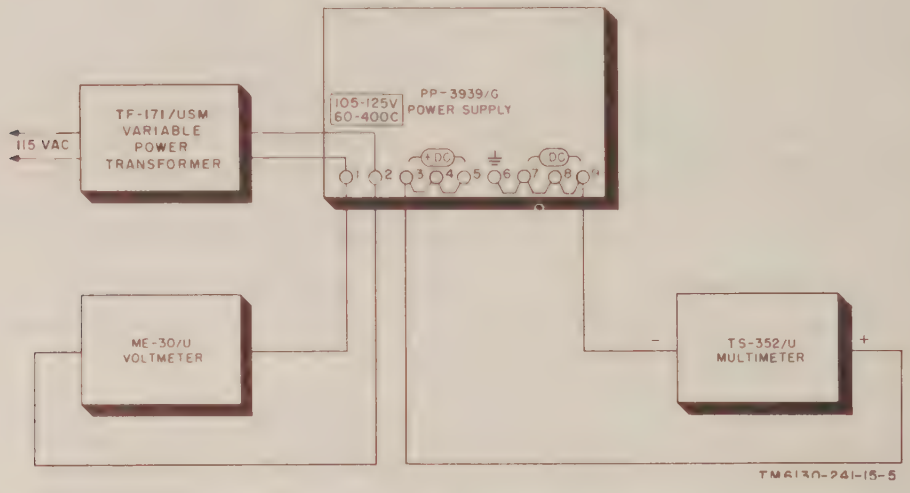


Figure 5-1. Range switch calibration test.

5-7. Meter Calibration Test

This test determines whether the power supply meter indications are within ± 2 percent of standard meter indications. Connect the equipment as shown in figure 5-2.

a. Set multimeter No. 1 to the 1-ampere scale.

b. Apply 105 volts ac to the power supply. Place the ON-OFF circuit breaker (fig. 2-1) to ON.

c. Adjust the output voltage of the power for 32 volts dc, using the range switches and the DC VERNIER CONTROL.

d. Adjust the adjustable resistor until the power supply is loaded to 1 ampere.

e. Compare the power supply ammeter and voltmeter readings with those of the external meters. The readings shall be in the range listed below (within ± 2 percent of the external meter readings).

(1) 31.4 to 32.6 volts dc.

(2) 0.98 to 1.02 amperes dc.

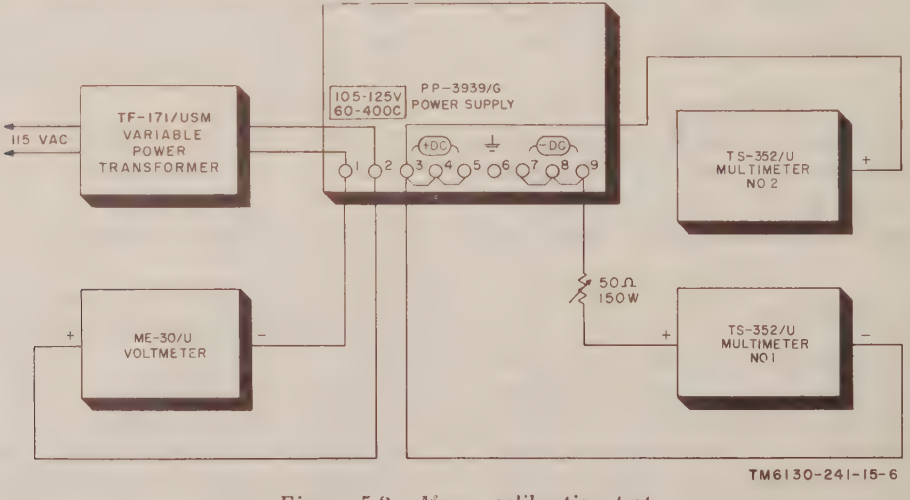


Figure 5-2. Meter calibration test.

5-8. Load Regulation and Ripple Test

This test determines whether the output voltage of the unit remains constant within specifications when the load is varied from full load to no load, and no load to full load. In addition, the test checks whether the ripple voltage remains within specification at full load and no load. Connect the equipment as shown in figure 5-3.

a. Set the multimeter to the 1-ampere scale.

b. Apply 105 volts ac to the power supply. Place the ON-OFF circuit breaker (fig. 2-1) to ON.

c. Set the output voltage of the power supply to 32 volts dc, using the range switches and the DC VERNIER CONTROL.

d. Adjust the load with the adjustable resistor from the no-load to the full-load condition and the full-load to the no-load condi- in several step changes.

e. Measure the regulation on the dc voltmeter. The maximum regulation range is 48 millivolts (mv).

f. Read the ripple voltage using the ac voltmeter. The maximum ripple voltage value should be 1 mv rms with either + DC or —DC grounded.

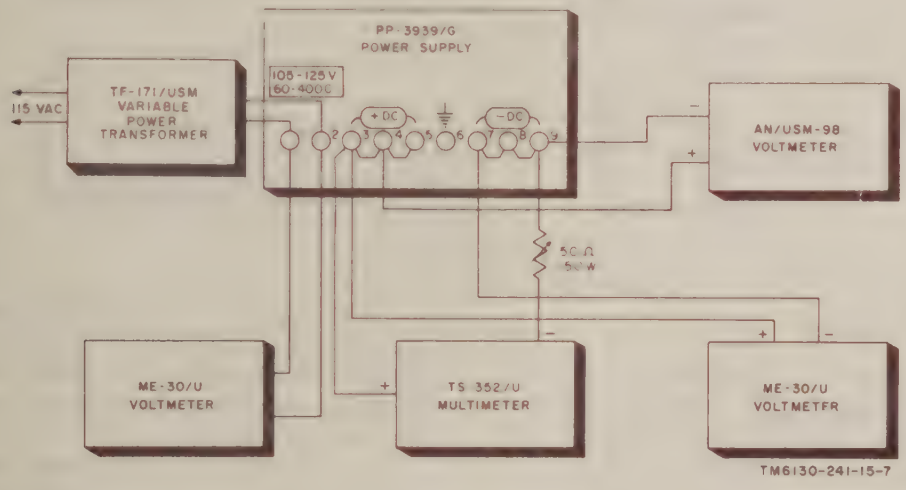


Figure 5-3. Load regulation and ripple test.

5-9. Line Regulation Test

This test checks whether the output voltage remains constant within specifications for a given variation in the input voltage. Connect the equipment as shown in figure 5-4.

a. Set the multimeter to the 1-ampere scale.

b. Apply 105 volts ac to the power supply. Place the ON-OFF circuit breaker (fig. 2-1) to the ON position.

c. Place the range switches in the A and C positions and adjust the DC VERNIER CONTROL for 32 volts dc.

d. Adjust the 50-ohm variable resistor for a 1-ampere load on the power supply.

e. Using the variable power transformer, vary the line voltage from 105 to 125 volts ac and measure the regulation on the dc voltmeter. The maximum regulation range must be 48 mv.

f. Remove the load and vary the line voltage from 125 to 105 volts ac and measure the regulation on the dc voltmeter. The maximum regulation range must be 48 mv.

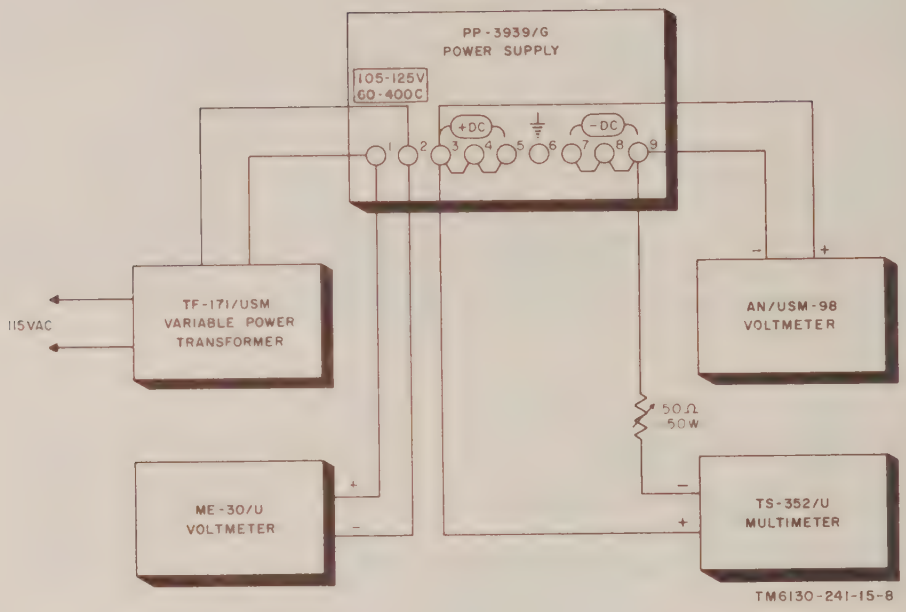


Figure 5-4. Line regulation test.

5-10. Breakout Test

This test determines the value of ac input voltages at which the unit under test fails to operate within specifications. Connect the equipment as shown in figure 5-5.

a. Set multimeter No. 1 to the 1-ampere *scale.*

b. Apply 105 volts ac to the power supply. Place the ON-OFF circuit breaker (fig. 2-1) to the ON position.

c. Set the output voltage of the power supply to 32 volts dc, using the range switches and the DC VERNIER CONTROL.

d. Adjust the adjustable resistor to load the power supply to 1 ampere.

e. Reduce the ac input voltage until the voltage recorded on the ac voltmeter across terminals 3 and 7 exceeds 1 mv.

f. Check the reading on the ac voltmeter across terminals 1 and 2 of the power supply. This reading must be below 104 volts ac.

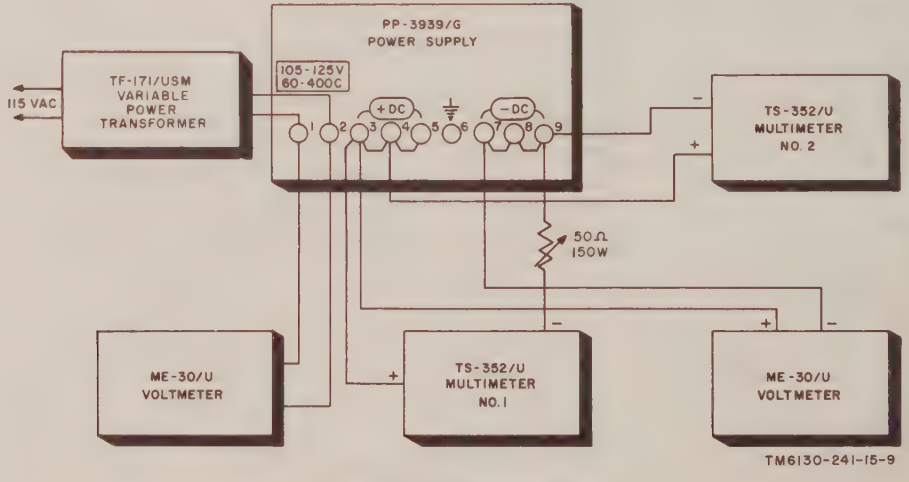


Figure 5-5. Breakout test.

5-11. Short-Circuit Test

This test determines whether the circuit breaker on the unit operates when the unit is short-circuited and also determines whether a short circuit has any damaging effect on the power supply.

a. Remove all test equipment from the terminals of the power supply.

b. Apply 115 volts ac power to the power supply. Place the ON-OFF circuit breaker (fig. 2-1) to ON.

c. Observe the output voltage on the power supply voltmeter (M1; fig. 6-3).

d. place a short circuit across the plus (+) and minus (—) terminals and hold it there until the ON-OFF circuit breaker of the power supply trips.

e. Remove the short circuit from the power supply. Reset the circuit breaker and check the voltmeter of the power supply to see that the dc voltage is the same as observed in *c* above.

5-12. Grounding Test

This test determines whether grounding of either the plus dc or minus dc output of the supply has any degrading effects on the ripple specification of the power supply. Connect the equipment as shown in figure 5-6.

a. Apply 115 volts ac to the power supply. Place the ON-OFF circuit breaker (fig. 2-1) to ON.

b. Set the output voltage to 32 volts, using the range switches and the DC VERNIER CONTROL.

c. Ground the plus (+) DC side of the power supply. The ripple reading on the ac voltmeter must not exceed 1 mv root mean square (rms).

d. Remove the ground from plus (+) DC and ground the minus (—) DC side of the power supply. The ripple reading on the ac voltmeter must not exceed 1 mv rms.

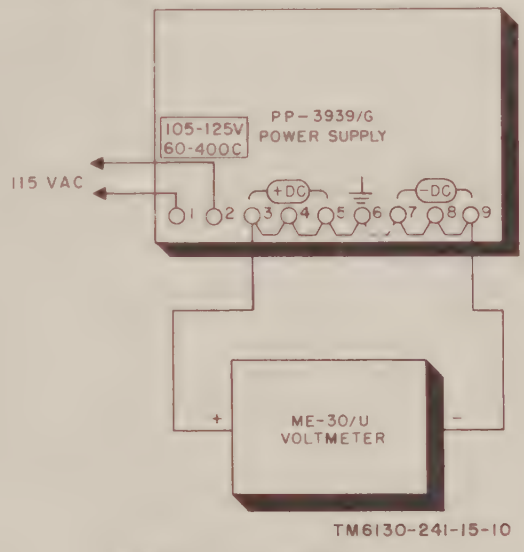


Figure 5-6. Grounding test.

CHAPTER 6

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

6-1. Disassembly of Equipment

Disassembly of the power supply consists of removing the power cord and the load conductors from the terminal board at the rear of the unit. Removal of the power supply from the relay rack may be necessary in some installations.

6-2. Repacking for Shipment or Limited Storage

The exact procedure for repackaging depends on the material available and the conditions under which the equipment is to be shipped or stored.

a. Materials Required. The following materials are required for packaging the power supply. For stock numbers of the materials, consult SB 38-100.

Material	Quantity
Filler material	4 lb
Corrugated cardboard	27 sq ft
Gummed tape	17 ft
Gummed waterproof tape	20 ft
Waterproof paper	25 sq ft

b. Packaging. Package the power supply as follows:

(1) Cushion the power supply on all surfaces with pads of filler material.
(2) Place the cushioned unit within a wrap of corrugated cardboard.
(3) Secure the wrap with gummed tape.
(4) Protect the corrugated cardboard wrap with a waterproof paper barrier.
(5) Seal the seams of the paper barrier with waterproof tape.

c. Packing.

(1) Place the package containing the power supply into a wooden box.
(2) Nail a wooden lid on the box.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

6-3. Authority for Demolition

The demolition procedures given in paragraph 6-4 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon the order of the commander.

6-4. Methods of Destruction

Any and or all of the methods of destruction given below may be used. The time available will be the major determining factor for the methods to be used in most instances when destruction of equipment is undertaken. The tactical situation also will determine how the destruction order will be carried out. In most cases, it is preferable to demolish completely some portions of the equipment rather than partially to destroy all the equipment parts.

a. Smash. Remove the power supply from its relay rack. Smash the rack. Use sledges, axes, machetes, hammers, crowbars, or any other heavy tools available.

b. Cut. Cut the cables, cords, and wires; use axes, machetes, and similar tools.

c. Burn. Burn the technical manuals first. Use gasoline, kerosene, flamethrowers, or incendiary grenades to complete the destruction of the set.

Warning: **Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.**

d. Explode. If explosives are necessary, use firearms, grenades, powder charges, or explosives to demolish the equipment where feasible.

e. Dispose. Scatter or bury the destroyed parts, or throw them into waterways. This is particularly important if a number of parts have not been completely destroyed.

APPENDIX I

REFERENCES

Following is a list of applicable references available to the operator and maintenance repair personnel of Power Supply, PP-3939/G.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, Lubrication Orders, and Modification Work Orders.
SB 38-100	Preservation, Packaging, and Packing Materials, Supplies, and Equipment Used by the Army.
TB SIG 355-1	Depot Inspection Standard for Repaired Signal Equipment.
TB SIG 355-2	Depot Inspection Standard for Refinishing Repaired Signal Equipment.
TB SIG 355-3	Depot Inspection Standard for Moisture and Fungus Resistant Treatment.
TB SIG 364	Field Instructions for Painting and Preserving Electronics Command Equipment.
TM 11-663	Electronic Power Supplies.
TM 11-55527	Multimeter TS-352/U.
TM 11-6625-200-12	Operator and Organizational Maintenance Manual: Multimeters ME-26A/U, ME-26B/U, and ME-26C/U.
TM 11-6625-203-12	Operator and Organizational Maintenance Manual: Multimeter AN/URM-105.
TM 11-6625-320-12	Organizational Maintenance Manual: Voltmeter ME-30A/U and Voltmeters, Electronic ME-30B/U, ME-30C/U, and ME-30E/U.
TM 11-6625-438-10	Operator's Manual: Voltmeter, Electronic AN/USM-98.
TM 11-6625-539-15	Operator, Organizational, Field and Depot Maintenance Manual: Test Set, Transistor TS-1836/U.
TM 38-750	Army Equipment Record Procedures.

GPO 812-256-5

APPENDIX II

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

A 2-1. General

This appendix lists items supplied for initial operation and for running spares. The list includes tools, parts, and material issued as part of the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

A 2-2. Columns

Columns are as follows:

a. Federal Stock Number. This column lists the 11-digit Federal stock number.

b. Designation by Model. Not used.

c. Description. Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

d. Unit of Issue. The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

e. Expendability. Nonexpendable items are indicated by NX. Expendable items are not annotated.

f. Quantity Authorized. Under "Items Comprising an Operable Equipment", the column lists the quantity of items supplied for the initial operation of the equipment. Under "Running Spare Items" the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for maintenance of the equipment.

g. Illustration. Not used.

Section II. OPERATOR'S FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION FIGURE NO.	ILLUSTRATION ITEM NO
[illegible]		POWER SUPPLY, PP-3939/G: Electronic type. Output data: 32 VDC, 1A; operating power requirements: 105-125 VAC, 50-400 CPS, single phase; overall dimensions: 19 inches long by 14-3/8 inches wide by 3-1/2 inches high. Filter included. Manufacturers data: Lambda Electronics		NX			
		Corp. Model LT-1095M					
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
ORD THRU AGC		TECHNICAL MANUAL TM 11-6130-241-15			2		
		RUNNING SPARE ITEMS					
[illegible]		FUSE, CARTRIDGE: 1 amp. 3 AG SLO-BLO Bussman p/n MDL-1			2		
[illegible]		FUSE, CARTRIDGE: 3 amp. 3 AG SLO-BLO Littlefuse p/n 313003			2		
5920-642-9007		FUSE, CARTRIDGE: 4 amp. 3 AG SLO-BLO Bussman p/n MDX-4			2		
[illegible]		LAMP, GLOW: GE type NE-51H			1		

APPENDIX III

MAINTENANCE ALLOCATION

Section 1. INTRODUCTION

A 3-2. General

a. This appendix assigns maintenance functions to be performed on components, assemblies and subassemblies by the lowest appropriate maintenance category.

b. Columns in the maintenance allocation chart are as follows:

(1) *Part or component.* This column shows only the nomenclature or standard item name. Additional descriptive data are included only where clarification is necessary to identify the component. Components, assemblies, and subassemblies are listed in top-down order. That is, the assemblies which are part of a component are listed immediately below that component, and subassemblies which are part of an assembly are listed immediately below that assembly. Each generation breakdown (components, assemblies, or subassemblies) is listed in disassembly order or alphabetical order.

(2) *Maintenance function.* This column indicates the various maintenance functions allocated to the categories.

(*a*) *Service.* To clean, to preserve, and to replenish lubricants.

(*b*) *Adjust.* To regulate periodically to prevent malfunction.

(*c*) *Inspect.* To verify serviceability and detect incipient electrical or mechanical failure by scrutiny.

(*d*) *Test.* To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(*e*) *Replace.* To substitute serviceable components, assemblies, or subassemblies, for unserviceable components, assemblies, or subassemblies.

(*f*) *Repair.* To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement of running spare type items such as fuses, lamps, or electron tubes.

(*g*) *Align.* To adjust two or more components of an electrical system so that their functions are properly synchronized.

(*h*) *Calibrate.* To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.

(i) *Overhaul.* To restore an item to *completely serviceable* condition as prescribed by serviceability standards developed and published by heads of technical services. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

(*j*) *Rebuild.* To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements using original manufacturing tolerances and/or specifications and subsequent reassembly of the item.

(3) *Operator, organization, direct support and depot.* The symbol X indicates the categories responsible for performing that particular mainte-

nance operation, but does not necessarily indicate that repair parts will be stocked at that level. Categories higher than those marked by X are authorized to perform the indicated operation.

(4) *Tools required.* This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) *Remarks.* Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding columns.

c. Columns in the allocation of tools for maintenance functions are as follows:

(1) *Tools required for maintenance functions.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

(2) *Operator, organization, direct support, general support, and depot.* The dagger (†) indicates the categories normally allocated the facility.

(3) *Tool code.* This column lists the tool code assigned.

A 3-2. Maintenance by Using Organizations

When this equipment is used by signal services organizations organic to theater headquarters or communication zones to provide functions allocated up to and including general support authorized to the organization operating this equipment.

SECTION II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON O/C	O	DS	GS	D	TOOLS REQUIRED	REMARKS
POWER SUPPLY PP-3939/G	service		X					
	adjust		X				4,5,7	Operational
	inspect		X					Visual
	test		X				4,5,7,9	
					X		1 thru 9,11,12,15	
						X	1 thru 7,9,11,12	Depot facilities
	replace		X					Pluck out items
	repair				X		1 thru 9,11,12,15	
	calibrate				X		1 thru 4,6,7,15	
	rebuild					X		Depot facilities
	overhaul				X			Shop facilities

SELMS Form 1151 (Replaces SELMS 004 TF, which is obsolete) 1 Apr 64 PP-3939/G

Army-Ft Monmouth, NJ-MON 1904-64

SECTION III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	MAINTENANCE CATEGORY O	C	O	DS	GS	D	TOOL CODE		REMARKS
PP-3939/G (continued)									
VOLTMETER, AN/USM-98						†	1	Army	Std. A
MULTIMETER, TS-352/U					†	†	2	Army	Std. A
MULTIMETER, ME-26B/U					†	†	3	Army	Std. A
TRANSFORMER VARIABLE TF-171/USM			†		†	†	4	Army	Std. A
RESISTOR VARIABLE,									
TOOL KIT, ELECTRONIC EQUIPMENT REPAIR TK-105/G			†		†	†	6	Army	Std. A
MULTIMETER, AN/URM-105			†				7	Army	Std.
VOLTMETER, ME-30/U					†	†	8	Army	Std. A
TRANSISTOR TEST SET TS-1836/U			†		†	†	9	Army	Std. A
TOOL KIT, ELECTRONIC EQUIPMENT REPAIR, TK-100/G					†	†	10	Army	Std. A

NOTE: Above tool and test equipment is also available for the AN/FPA-15 in which this equipment is used, with the exception of items 1 and 5.

APPENDIX IV

ORGANIZATIONAL, DIRECT AND GENERAL SUPPORT, AND DEPOT REPAIR PARTS LIST

Section I. INTRODUCTION

A 4-1. General

a. This appendix includes an organizational, direct and general support, and depot special tools list.

(1) The organizational maintenance repair parts and special tools list lists repair parts authorized for organizational maintenance and is a basis for requisitioning by organizations which are authorized the major item of equipment. End items of equipments are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

(2) The direct and general support and depot maintenance repair parts and special tools list lists the quantities of repair parts authorized for general support maintenance and is a basis for requisitioning authorized parts. It is also a guide for depot maintenance in establishing initial levels of spare parts.

b. Columns are as follows:

(1) *Source, maintenance, and recoverability code.* Source, maintenance, and recoverability codes indicate the technical service responsible for supply, maintenance category at which an item is stocked, categories at which an item is installed or repaired, and whether an item is repairable or salvageable. The source code column is divided into four parts.

(*a*) *Column A.* This column indicates the materiel code and designates the area of responsibility for supply. AR 310-1 defines the basic numbers used to identify the materiel code. If the part is Signal materiel responsibility, the column is left blank.

(*b*) *Column B.* This column indicates the point within the maintenance system where the part is available. "P" indicates that the repair part is a high mortality part; procured by technical services, stocked in and supplied from the technical service depot system, and authorized for use at indicated maintenance categories. "P1" indicates that the repair part is a low mortality part; procured by technical services, stocked only in and supplied from technical service *key* depots, and authorized for installation at indicated maintenance categories.

(*c*) *Column C.* This column indicates the lowest maintenance category authorized to install the part.

"O"—Organizational maintenance (operator and organizational).
"H"—General support maintenance.

(*d*) *Column D.* Not used.

(2) *Federal stock number.* This column lists the 11-digit Federal Stock number.

(3) *Designation by model.* Not used.

(4) *Description.* Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

(5) *Unit of issue.* The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(6) *Expendability.* Nonexpendable items are indicated by NX. Expendable items are not annotated.

(7) *Quantity incorporated in unit.* This column lists the quantity of each part found in a given assembly, component, or equipment.

(8) *Organizational.* An asterisk (*) indicates that an item is not authorized for stockage but if required, may be requisitioned for immediate use only.

(9) *Direct support.* No parts authorized for stockage.

(10) *General support.* The numbers in this column indicate quantities of repair parts authorized for initial stockage for use in general support maintenance. The quantities are based on 100 equipments to be maintained for a 15-day period.

(11) *Depot.* The numbers in this column indicate quantities of repair parts authorized for depot maintenance and for initial stockage for maintenance, and for supply support to lower categories. The entries are based on the quantity required for rebuild of 100 equipments.

(12) *Illustrations.* The "Item No." column lists the reference designations that appear on the part in the equipment. These same designations are also used on any illustrations of the equipment. The numbers in the "Figure No." column refer to the illustrations where the part is shown.

A 4-2. Parts for Maintenance

When this equipment is used by signal service organizations organic to theater headquarters or communication zones to provide theater communications, those repair parts authorized up to and including general support are authorized for stockage by the organization operating this equipment.

A 4-3. Requisitioning Information

a. The allowance factors are based on 100 equipments. In order to determine the number of parts authorized for initial stockage for the specific number of equipments supported, the following formula will be used and carried out to two decimal places.

$$\text{Specific number of equipments supported} \times \frac{\text{allowance factor}}{100} = \text{Number of parts authorized for initial stockage.}$$

b. Fractional values obtained from above computation will be rounded to whole numbers as follows:

(1) When the total number of parts authorized is less than 0.5, the quantity authorized will be zero.

(2) When the total number of parts authorized is between 0.5 and 1.0, the quantity authorized will be one.

(3) For all values above one, fractional values below 0.5 will revert to the next lower whole number and fractional value 0.5 and above will advance to the next higher whole number.

c. The quantities determined in accordance with the above computation represent the initial stockage for a 15-day period.

GPO 812–256–4

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	ORGANIZATIONAL	ILLUSTRATION	
							FIGURE NO.	ITEM NO.
		POWER SUPPLY PP-3939/G						
6130-985-9137		POWER SUPPLY PP-3939/G: Full wave rectification; output data: 0-32 vdc, 0-1 amp; 6.3 vac, no current rating; oper power req: 105-125 vac, 50-400 cps; single phase; o/a dim: 19 in lg X 3.5 in w X 14.375 in deep; filter incl; mfr data: Lambda Electronics Corp, Melville, L.I., N.Y. Code No. 80103, Model LT1095AM; general purpose use		NA				
5920-131-9821		FUSE, CARTRIDGE: 3 amp, 125 V; time delay 3 sec min 500% load; Littlefuse p/n 313003			1	*	3-2	F1
5920-131-9816		FUSE, CARTRIDGE: 1 amp, 250 V; time delay 25 sec min at 200% load; 8 sec min at 300% load; Ordnance dwg p/n 10300253			1	*	6-1	F2
5920-642-9007		FUSE, CARTRIDGE: Bussman p/n MDX 4			1	*	6-1	F3
6240-682-3411		LAMP, GLOW: MIL type NE51H			2	*		DS1, DS2

AMSEL-MR Form 1 Dec 64 6009 (Supersedes SELMS-2 (TF))

END

Army-Ft Monmouth, NJ-MON 5726-64

Section III. DIRECT AND GENERAL SUPPORT AND DEPOT FUNCTIONAL PARTS LIST

SOURCE CODE				FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	DIRECT SUPPORT	GENERAL SUPPORT	DEPOT	ILLUSTRATION	
A	B	C	D										FIGURE NO.	ITEM NO.
						POWER SUPPLY PP-3939/G								
				6130-985-8137		POWER SUPPLY PP-3939/G: Full wave rectification; output data: 0-32 vdc, 0-1 amp; 6.3 vac, no current rating; oper power req: 105-125 vac, 50-400 cps; single phase; o/a dim: 19 in lg X 3.5 in w X 14.375 in deep; filter incl; mfr data; Lambda Electronics Corp, Melville, L.I., N.Y. Code No. 80103, Model LT1095AM; general purpose use		NX						
	P1	H		6625-973-8867		AMMETER: lamp full scale ±2%; Lambda Electronics p/n EDN-10-004			1		2.2	3.0	3-1	M2
	P1	H				CABLE, POWER, ELECTRICAL: Lambda Electronics p/n RPP-38-006 Mailroom No. M5RC29-A002			1		2.2	5.0		
	P	H		5910-954-3975		CAPACITOR, FIXED, CERAMIC DIELECTRIC: 80,000 pico farads -0, + not rated; Lambda Electronics p/n CDL-20-002			1		2.2	3.0		C7
	P	H				CAPACITOR, FIXED, ELECTROLYTIC: Lambda Electronics p/n CBS-30-002 Mailroom No. M5RC29-A007			1		2.2	5.0	6-1	C1
	P	H		5910-883-1458		CAPACITOR, FIXED, ELECTROLYTIC: 250 uf -10% +150%; 55 vdc; Lambda Electronics p/n CBR-25-002			3		3.9	9.0	6-1	C2,C3, C4
	P	H				CAPACITOR, FIXED, ELECTROLYTIC: Lambda Electronics p/n CBR-15-001 Mailroon No. M5RC29-A012			2		3.2	6.0	6-1	C6,C10
	P	H				CAPACITOR, FIXED, ELECTROLYTIC: Lambda Electronics p/n CBS-50-003 Mailroom No. M5RC29-A015			1		2.2	3.0	6-1	C9
	P	H				CAPACITOR, FIXED, ELECTROLYTIC: Lambda Electronics p/n CBR-25-003 Mailroom No. M5RC29-A017			1		2.2	3.0	6-1	C11
	P	H		5910-666-8272		CAPACITOR, FIXED, PAPER DIELECTRIC: 47,000 uuf ±10%; 200 vdc; Lambda Electronics p/n CAL-47-002			3		3.9	9.0	6-1	C5,C8, C12

SOURCE CODE				FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	DIRECT SUPPORT	GENERAL SUPPORT	DEPOT	ILLUSTRATION	
													FIGURE NO	ITEM NO
A	B	C	D											
						PP-3939/G (continued)								
	P	H				CIRCUIT BREAKER: Lambda Electronics p/n FHB-01-251-2 Mailroom No. M5RC29-A022								
	P	H		5930-829-3210		CIRCUIT BREAKER: Thermostatic, opens at 167°F, 5° temp differential; bimetal rating; 240 V; 30 amp; Spencer Thermostat Div p/n 20410L-21-368								
	P	O		5920-131-9821		FUSE, CARTRIDGE: 3 amp, 125 V; time delay 3 sec min 500% load; Littelfuse p/n 313003								
	P	O		5920-131-9816		FUSE, CARTRIDGE: 1 amp, 250 V; time delay 25 sec min at 200% load; 8 sec min at 300% load; Ordnance dwg p/n 10300253								
	P	O		5920-642-9007		FUSE, CARTRIDGE: Bussman								
	P	H		5920-156-9233		FUSEHOLDER: extractor								
	P	H				FUSEHOLDER: Lambda Electronics HRM-00-001 Mailroom No. M5RC29-A035								
	P	O		6240-682-3411		LAMP, GLOW: MIL type NE51H								
	P	H		6210-954-5135		LIGHT, INDICATOR:								
	P	H		5905-195-6809		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF122J								
	P	H		5905-195-6451		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF472K								
	P	H		5905-195-6791		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF681J								

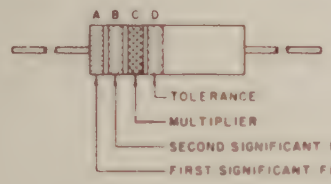
SOURCE CODE				FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	DIRECT SUPPORT	GENERAL SUPPORT	DEPOT	ILLUSTRATION	
A	B	C	D										FIGURE NO.	ITEM NO
						PP-3939/G (continued)								
	P	H		5905-185-8510		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF1[illegible]3J			2		[illegible]	[illegible]		R13, R14
	P	H		5905-195-6502		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF332K			[illegible]		[illegible]	[illegible]		R15, R27, R32
	P	H		5905-252-2995		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF220K			[illegible]		[illegible]	[illegible]		R27
	P	H		5905-279-1898		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF560K			1		[illegible]	[illegible]		R[illegible]
	P	H		5905-279-3513		RESISTOR, FIXED, COMPOSITION: MIL type MS35043-71			1		2.[illegible]	[illegible]		R30
	P	H		5905-190-8889		RESISTOR, FIXED, COMPOSITION: MIL type RC20GF101J			1		[illegible]	[illegible]		R[illegible]
	P	H		5905-256-0412		RESISTOR, FIXED, COMPOSITION: MIL type RC42GF181J			1		[illegible]	[illegible]		R[illegible]
	P	H				RESISTOR, FIXED, WIREWOUND: Lambda Electronics p/n DFN-10-005 Mailroom No. M5RC29-A062			1		2.2	[illegible]	6-1	R1
	P	H				RESISTOR, FIXED, WIREWOUND: Lambda Electronics p/n DFR-30-006 Mailroom No. M5RC29-A063			1		2.2	3.0	6-1	R2
	P	H				RESISTOR, FIXED, WIREWOUND: Lambda Electronics p/n DFN-40-011 Mailroom No. M5RC29-A064			1		2.2	3.[illegible]	6-1	R3
	P	H				RESISTOR, FIXED, WIREWOUND: Lambda Electronics p/n DFN-20-009 Mailroom No. M5RC29-A065			2		3.2	6.[illegible]		R4, R5
	P	H				RESISTOR, FIXED, WIREWOUND: Lambda Electronics p/n DFR-60-009 Mailroom No. M5RC29-A068			1		2.2	3.0	6-1	R7
	P	H				RESISTOR, FIXED, WIREWOUND: Lambda Electronics p/n DFR-60-005 Mailroom No. M5RC29-A077			4		4.6	12.0		R17, R2[illegible], R28, R29

SOURCE CODE				FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	DIRECT SUPPORT	GENERAL SUPPORT	DEPOT	ILLUSTRATION	
													FIGURE NO.	ITEM NO.
A	B	C	D											
						PP-3939/G (continued)								
	P	H		5905-960-3748		RESISTOR, FIXED, WIREWOUND: 1200 ohm ±2%, 3 w; Lambda Electronics p/n DFS-12-016			1		2.2	3.0		R19
	P	H				RESISTOR, FIXED, WIREWOUND: Lambda Electronics p/n DFR-25-003 Mailroom No. M5RC29-A082			1		2.2	3.0		R22
	P	H				RESISTOR, FIXED, WIREWOUND: Lambda Electronics p/n DFR-30-004 Mailroom No. M5RC29-A024			1		2.2	3.0		R24
	P	H		5905-954-1777		RESISTOR, FIXED, WIREWOUND: 1.5 ohm, ±10%, 2 w; International Resistance Co p/n BWH-1-1.5 ohms			1		2.2	3.0		R31
	P	H				RESISTOR, FIXED, WIREWOUND: Lambda Electronics p/n DFR-25-007 Mailroom No. M5RC29-A094			1		2.2	3.0	6-1	R34
	P	H				RESISTOR, FIXED, WIREWOUND: Lambda Electronics p/n DFP-10-007 Mailroom No. M5RC29-A095			1		2.2	3.0	6-1	R35
	P	H		5905-686-2872		RESISTOR, FIXED, WIREWOUND: 5 ohm, ±5%, 5 w; Ward Leonard Elec Co p/n DFN-50-012			1		2.2	3.0	6-1	R36
	P	H				RESISTOR, VARIABLE, WIREWOUND: CTS Corp p/n LB3363 Lambda Electronics p/n DNS-10-005 Mailroom No. M5RC29-A081			1		3.0	4.0	6-1	R37
	P	H				RESISTOR, VARIABLE, WIREWOUND: CTS Corp p/n LB3364 Lambda Electronics p/n DNR-20-001 Mailroom No. M5RC29-A083			1		4.0	5.0	6-1	R38
	P1	H				RETAINER, CAPACITOR: Lambda Electronics p/n CWE-06-001 Mailroom No. M5RC29-A101			1		1.5	2.0		
	P1	H				RETAINER, CAPACITOR: Lambda Electronics p/n CWE-08-002 Mailroom No. M5RC29-A102			1		1.5	2.0		

SOURCE CODE				FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	DIRECT SUPPORT	GENERAL SUPPORT	DEPOT	ILLUSTRATION	
A	B	C	D										FIGURE NO.	ITEM NO.
						PP-3939/G (continued)								
	P	H				RETAINER, CAPACITOR: Lambda Electronics p/n CWB-21-004 Mailroom No. M5RC29-A103			2		1.5	2.0		
	P	H				SEMICONDUCTOR DEVICE, DIODE: Lambda Electronics p/n FBL-00-019 Mailroom No. M5RC29-A118			1		2.2	3.0	6-1	CR1
	P	H				SEMICONDUCTOR DEVICE, DIODE: Lambda Electronics p/n FBL-00-017 Mailroom No. M5RC29-A119			2		3.2	6.0		CR2, CR3
	P	H		5960-960-3715		SEMICONDUCTOR DEVICE, DIODE: GE Co Semiconductor Products p/n 4JA4BX460			4		4.6	12.0		CR4, CR6, CR7, CR8
	P	H				SEMICONDUCTOR DEVICE, DIODE: Lambda Electronics p/n FBM-SZ-816 Mailroom No. M5RC29-A122			1		2.2	3.0		CR5
	P	H		5930-347-4109		SWITCH, TOGGLE: dpdt; 250 V ac/dc, 3 amp nom curr; Cutler Hammer p/n 8908K469			2		3.2	5.0		S1, S2
	P	H				TERMINAL BOARD: Lambda Electronics p/n HAJ-03-104 Mailroom No. M5RC29-A129			2		3.2	3.0		
	P	H				TRANSFORMER: Lambda Electronics p/n AAP-40-012 Mailroom No. M5RC29-A13-			1		2.2	3.0	6-1	T1
	P	H		5960-847-4064		TRANSISTOR: Motorola p/n 2N1537			4		4.6	12.0	6-1	Q1 thru Q4
	P	H		5960-708-0122		TRANSISTOR: RCA p/n 2N270			1		2.2	3.0		Q5
	P	H		5960-556-9001		TRANSISTOR: RCA p/n 2N217			6		6.5	15.0		Q6 thru Q11
	P	H		5960-685-9032		TRANSISTOR: RCA p/n 2N647			1		2.2	3.0		Q12
	P	H		6625-844-7849		VOLTMETER: panel type; 0-35 vdc, linear; ±2% accuracy; 1000 ohms per volt sensitivity			1		2.2	3.0	3-1	M1

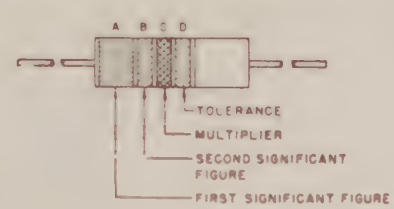
COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS

COMPOSITION-TYPE RESISTORS



BAND A— Equal Width Band Signifies Composition-Type

WIREWOUND-TYPE RESISTORS



BAND A— Double Width Signifies Wire-wound Resistor

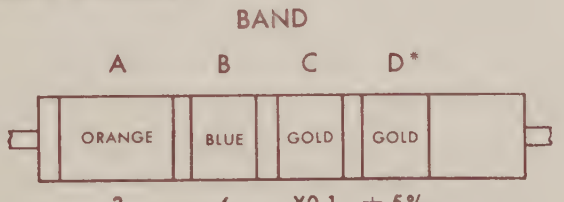
COLOR CODE TABLE

BAND A		BAND B		BAND C		BAND D*	
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)
BLACK	0	BLACK	0	BLACK	1		
BROWN	1	BROWN	1	BROWN	10		
RED	2	RED	2	RED	100		
ORANGE	3	ORANGE	3	ORANGE	1,000		
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	± 10
GREEN	5	GREEN	5	GREEN	100,000	GOLD	± 5
BLUE	6	BLUE	6	BLUE	1,000,000		
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7				
GRAY	8	GRAY	8	SILVER	0.01		
WHITE	9	WHITE	9	GOLD	0.1		

EXAMPLES OF COLOR CODING

NOMINAL RESISTANCE 3,900 Ohms

RESISTANCE TOLERANCE ± 10 percent



3.6 Ohms

± 5 percent

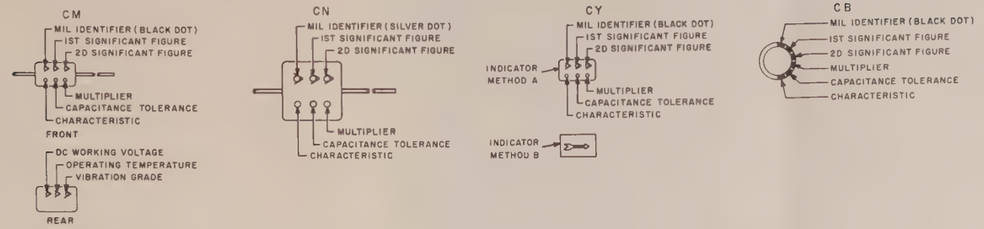
STD-R2

*If Band D is omitted, the resistor tolerance is ± 20%, and the resistor is not Mil-Std.

Figure 6-1. Color-code marking for MIL-STD resistors.

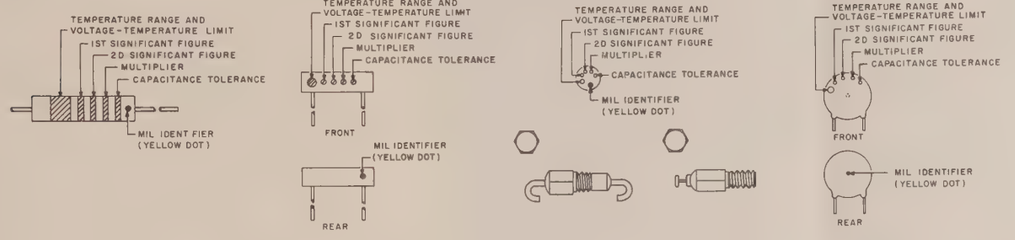
COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS

GROUP I Capacitors, Fixed, Various-Dielectrics, Styles CM, CN, CY, and CB



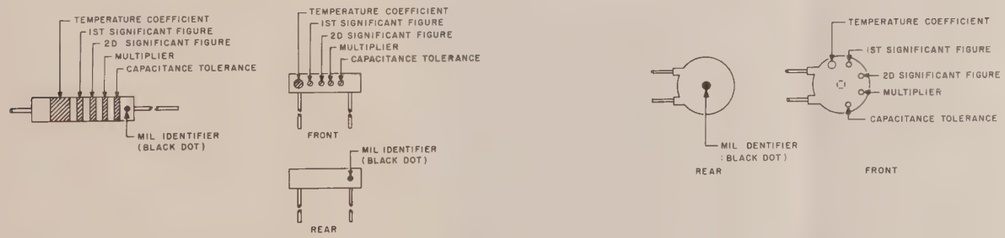
MICA-DIELECTRIC | PAPER-DIELECTRIC | GLASS-DIELECTRIC, GLASS CASE | MICA, BUTTON TYPE

GROUP II Capacitors, Fixed Ceramic-Dielectric (General Purpose) Style CK



AXIAL LEAD | RADIAL LEAD | FEED-THROUGH | STAND-OFF | DISK-TYPE

GROUP III Capacitors, Fixed, Ceramic-Dieletric (Temperature Compensating) Style CC



AXIAL LEAD | RADIAL LEAD | DISK-TYPE

Figure 6-2. Color-code marking for MIL-STD capacitors.

COLOR CODE TABLES

TABLE I – For use with Group I, Styles CM, CN, CY and CB

COLOR	MIL ID	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE				CHARACTERISTIC[2]				DC WORKING VOLTAGE	OPERATING TEMP. RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CY	CB	CM	CM	CM
BLACK	CM, CY CB	0	0	1			± 20%	± 20%		A				−55° to +70°C	10–55 cps
BROWN		1	1	10					B	E		B			
RED		2	2	100	± 2%		± 2%	± 2%	C		C			−55° to +85°C	
ORANGE		3	3	1,000		± 30%			D			D	300		
YELLOW		4	4	10,000					E					−55° to +125°C	10–2,000 cps
GREEN		5	5		± 5%				F				500		
BLUE		6	6											−55° to +150°C	
PURPLE (VIOLET)		7	7												
GREY		8	8												
WHITE		9	9												
GOLD				0.1			± 5%	± 5%							
SILVER	CN				± 10%	± 10%	± 10%	± 10%							

TABLE II – For use with Group II, General Purpose, Style CK

COLOR	TEMP. RANGE AND VOLTAGE – TEMP. LIMITS[3]	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE	MIL ID
BLACK		0	0	1	± 20%	
BROWN	AW	1	1	10	± 10%	
RED	AX	2	2	100		
ORANGE	BX	3	3	1,000		
YELLOW	AV	4	4	10,000		CK
GREEN	CZ	5	5			
BLUE	BV	6	6			
PURPLE (VIOLET)		7	7			
GREY		8	8			
WHITE		9	9			
GOLD						
SILVER						

TABLE III – For use with Group III, Temperature Compensating, Style CC

COLOR	TEMPERATURE COEFFICIENT[4]	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE		MIL ID
					Capacitances over 10uuf	Capacitances 10uuf or less	
BLACK	0	0	0	1		± 2.0uuf	CC
BROWN	−30	1	1	10	± 1%		
RED	−80	2	2	100	± 2%	± 0.25uuf	
ORANGE	150	3	3	1,000			
YELLOW	220	4	4				
GREEN	330	5	5		± 5%	± 0.5uuf	
BLUE	470	6	6				
PURPLE (VIOLET)	750	7	7				
GREY		8	8	0.01			
WHITE		9	9	0.1	± 10%		
GOLD	± 100					± 1.0uuf	
SILVER							

1. The multiplier is the number by which the two significant (SIG) figures are multiplied to obtain the capacitance in uuf.
2. Letters indicate the Characteristics designated in applicable specifications: MIL–C–5, MIL–C–91, MIL–C–11272, and MIL–C–10950 respectively.
3. Letters indicate the temperature range and voltage-temperature limits designated in MIL–C–11015.
4. Temperature coefficient in parts per million per degree centigrade.

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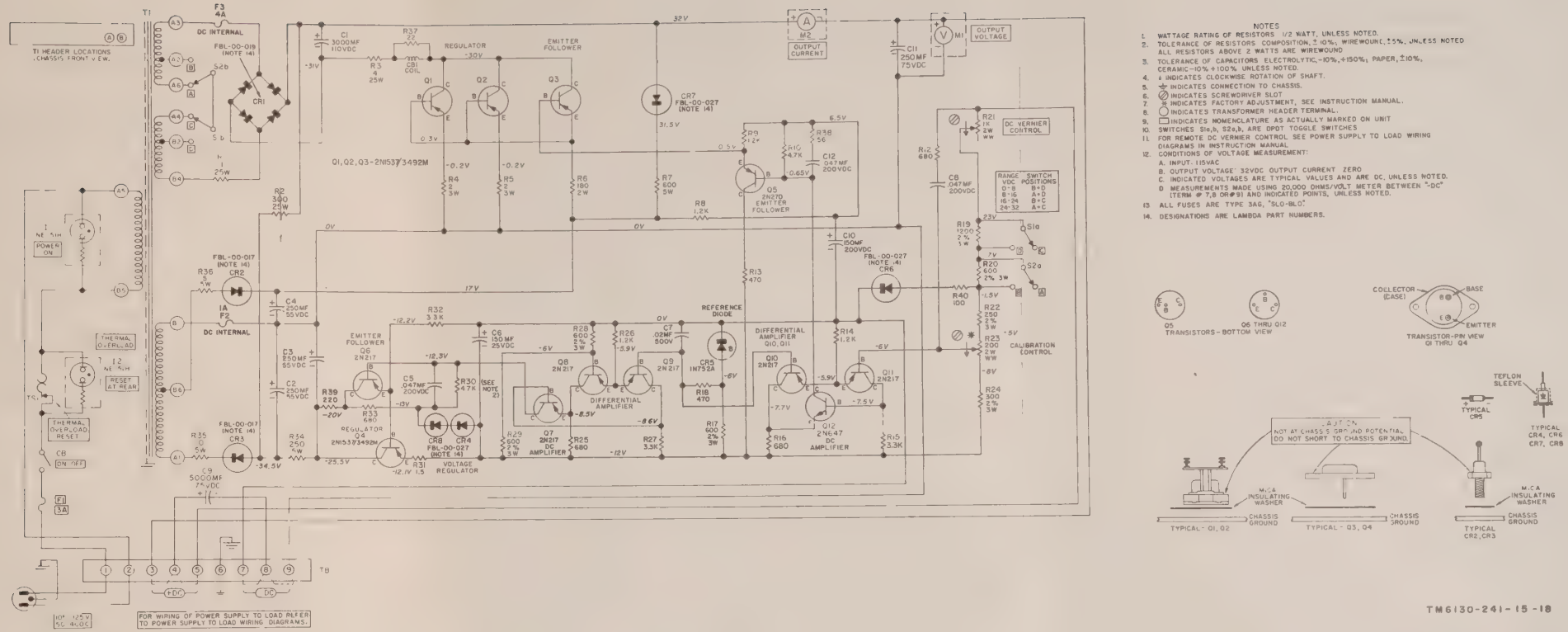

Figure 6-3. Power Supply PP-3939/G. complete schematic diagram.

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
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